

# **JOHNSTON COUNTY AQUATIC INVENTORY**

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# JOHNSTON COUNTY AQUATIC INVENTORY

## Introduction

Johnston County is a large county (792 square miles) located in the fall zone between the Piedmont and the Coastal Plain of North Carolina, with portions in both physiographic regions. The county lies almost entirely within the Neuse River Basin, which begins in the triangle area of the state and drains directly into the Pamlico Sound. This basin drains 6,235 square miles of land area and contains 3,000 miles of streams.

The Johnston County population in 2000 was 21,965, which is an increase of 50% since 1990. Historically, Johnston County contained chiefly small towns, but with I-40 and I-95 crossing near the center of the county, urbanization has increased rapidly. Johnston County contains 10 municipalities, listed in order of size: Smithfield (county seat since 1771), Clayton, Selma, Benson, Kenly, Four Oaks, Pine Level, Princeton, Wilson's Mills, and Micro. The county's economy is increasingly relying more on tourism and sales. Currently, the county annually exceeds \$1 billion per year in retail sales. In spite of rapid growth, Johnston County has been able to maintain much of its rural character, with a moderate amount of green space remaining in developing communities. Historically, the county's economy was based largely in agriculture and pine plantations that were owned and managed by national timber companies. Johnston County was established in 1746 and has a rich heritage of cultural history, particularly in agriculture and the Civil War. Reenactments of civil war battles, and agricultural, musical, holiday, and other types of festivals occur annually.

The objective of this project was to survey Johnston County for aquatic species, including freshwater mussels, sphaeriid clams, aquatic snails, crayfishes, and fishes. Our goals were to determine species presence, distribution, relative abundance, and relative health. Due to time constraints, we focused most efforts toward surveys of rare species. Figure 1 and Table 1 detail the localities of all sites surveyed. Most of the streams surveyed were tannic, with higher velocities occurring in northwestern streams and more swampy slack conditions in southeastern streams. Depth varied from very shallow to moderately deep (mostly shallow to moderate), and widths ranged from 3 to 25 m, with the exceptions of Neuse River, which was much wider. Percent cover over streams was greater than 50% for about half of streams surveyed. Stream substrate consisted of varying amounts of silt, cobble, pebble, gravel, boulder, clay, and sand in the northwestern streams and large rivers, and substrate in the southeastern streams consisted of the same components and also a high degree of mud, detritus, and vegetation. Bank height was generally very low (most less than 1 m), and banks were mostly stable with some undercutting. Buffer widths were narrow to wide, and riparian vegetation consisted of mostly trees and shrub-brush with some grass or marsh plants. Woodland area surrounding streams was generally intermediate or not extensive with low to moderate amounts of windthrow. Approximately one-third of the surrounding area was natural, and the other two-thirds consisted of rural or urban housing, cropland or pasture, and a significant amount of timber cuts of various ages. The following sections provide results of the aquatic inventory for each of the taxa mentioned above.

## **Acknowledgements**

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## Methods

A total of 28 sites were surveyed during this study (May through November 2001) (Table 1, Figure 1). Sites were usually accessed at bridge crossings, and we walked upstream (-) or downstream (+) for distances ranging from 50 to 400m. At some sites, we canoed stretches from bridge crossing to bridge crossing. Visual estimates of substrate composition, average stream width, average depth, bank height and stability, width and composition of the riparian buffer, and any other relevant site characteristics were recorded at each site. Map locations in latitude/longitude were acquired using Garmin 12 XL or Trimble GeoExplorer Global Positioning System units. Both bivalve and gastropod mollusks were observed or collected during visual, dipnet, and tactile searches of the streambed. Gastropod mollusks and sphaeriid clams also were observed or collected during visual, dipnet, and tactile searches of aluminum cans, bottles, and other anthropogenic materials, woody debris, leaf packs, and aquatic plants. Live freshwater mussels were identified, measured, and returned to the stream. Shell material was retained if in suitable condition for museum collections. The presence or absence of *Corbicula fluminea* was noted. Crayfishes and fishes were collected by dipnet, overturning rocks, and/or using a backpack electroshock unit. Specimens that were not identified in the field were preserved in 70% to 95% ethanol for later identification.

## Aquatic Snail and Pea Clam Results & Discussion

Of the 28 sites surveyed, 23 were surveyed in some manner for aquatic snails and they were collected or observed at 22 localities (Table 2). Site 2 was predominantly surveyed for mussels, while sites 6, 8, 12, and 25 were predominantly surveyed for crayfish and fish and are excluded from the results reported herein. At least 9 species representing 7 families were documented during the Johnston County aquatic inventory: *Campeloma decisum* (pointed campeloma), *Elimia catenaria* (gravel elimia), *Ferrissia* sp., *Helisoma anceps* (two-ridge rams-horn), Hydrobiidae (hydrobiid), *Laevapex fuscus* (dusky ancylid), *Micromenetus dilatatus* (bugle sprite), *Physella* sp. (physa snail), and *Pseudosuccinea columella* (mimic lymnaea). Presently, there are no known rare or endangered aquatic snails that occur in Johnston County (LeGrand, Jr. et al. 2001). No one species dominated the waterways, but *Physella* sp. was the most common and widespread gastropod, residing at 15 sites. Other common species included Hydrobiidae and *M. dilatatus*, both residing at 11 sites. The remaining snail species were represented at a smaller number of sites, ranging from 2-9. Abundance estimates for each species were usually not determined due to time constraints, but where they were, most species were uncommon to common. Recent reproduction was seen at a number of sites for most of the snail species collected during the survey, but varied widely depending on the species. Due to the minute size of some of the species (e.g., *Micromenetus dilatatus* and Hydrobiidae) it was difficult to confirm whether these were adults or juveniles and typically, reproduction was not recorded. Additional sites and information for historical records are noted in Table 3.

Over the same time period and at 25 of the 28 sites, freshwater clams were collected or observed at 24 localities (Table 2). Site 2 was surveyed predominantly for mussels, while sites 6 and 8 were surveyed predominantly for fish and crayfish and are excluded from the results reported herein. Eight species of freshwater clams were documented during the Johnston County aquatic inventory: *Musculium partumeium* (swamp fingernailclam), *M. securis* (pond fingernailclam), *Pisidium adamsi* (Adam peaclam), *P. casertanum* (ubiquitous peaclam), *P. dubium* (greater



eastern peaclam), *P. equilaterale* (round peaclam), *Sphaerium striatinum* (striated fingernailclam), and the exotic *Corbicula fluminea* (Asian clam). Presently, there are no known rare or endangered freshwater clams that occur in North Carolina (LeGrand, Jr. et al. 2001). Of the 24 sites where clams were collected, the Asian clam was present at 14 localities and was the only clam noted at 10 of these sites. The swamp fingernailclam occupied at least 6 sites (most likely 10 sites with the addition of *Musculium* sp. specimens) and was the sole sphaeriid clam at 3 (or 6) of those sites. The remaining sphaeriids were present at only 1 to 4 sites. Like the gastropods, abundance estimates were typically not recorded but when they were, they ranged from abundant to rare. Evidence of reproduction was variable as well depending on the species. Additional sites and information for historical records are noted in Table 3.

Overall, the diversity and abundance of freshwater snails in the waterways associated with Johnston County is fair. The number of species is moderate when compared to surveys conducted in other parts of the state, but the overall distribution of these species is comparatively low. Unlike the snail fauna, we collected a relatively high number of pea clam species when compared to previous surveys in other parts of the state. Given the number of unsurveyed streams and the presence of larger streams and rivers like the Neuse and Little rivers and Swift Creek, we suspect that the number of pea clam and snail species is likely higher.

The influence of geomorphologic and topographic factors has most likely structured the current gastropod and sphaeriid fauna of the area. Major landscape scale factors such as these are known to influence and impact the distribution and abundance of organisms over time. While water chemistry parameters were not measured at the surveyed sites, cumulative impacts from poor land uses could be affecting the quality of the waterways. The presence of agriculture and logging operations within close proximity to some of the surveyed water bodies has most likely had a negative impact on stream quality through animal waste infiltration and sedimentation, respectively. While these impacts may not have had a significant effect on the current aquatic snail and clam diversity, they are likely affecting the current abundance and distribution of each species. Effects from urbanization also are likely present due to the 50% population increase since 1990.

Taxonomic uncertainties within the freshwater snail fauna make the results here subject to revision. For example, the differentiation between *F. rivularis* and *F. fragilis* is difficult due to shell shape variation. Therefore, a common factor used to distinguish these species is the habitat they are collected in, with *F. rivularis* colonizing rivers and streams and *F. fragilis* inhabiting stagnant areas such as ditches, ponds, and backwater areas. All of the limpets identified as *Ferrissia* during this survey were identified to genus only, but it is possible that at least both species inhabit some of the sites that were surveyed. Likewise, many uncertainties exist as to the taxonomy of *Physella* and hydrobiids without examination of soft parts (Burch 1989). Since we did not preserve the specimens for the examination of soft parts, we identified these specimens to genus only.

The collection of *Pisidium equilaterale* was a significant find, as it has never been previously documented in North Carolina (G.L. Mackie, University of Guelph, pers. comm.). The historical range of the species is described as occupying southeastern Canada to eastern Lake Superior, extending south to Virginia, Pennsylvania and Illinois (Burch 1975). While no additional rare or



significant snail or pea clam species were collected during the survey of Johnston County, continual research and status surveys are needed to clarify the status of a number of these species. Current land management practices, including agriculture and urbanization, are having an effect on the snail and pea clam fauna in North Carolina. As nongame biologists, we need to identify which species are at risk and identify ways to reduce or eliminate impacts.

## Freshwater Mussel Results & Discussion

At least 19 species of freshwater mussel have been documented from the waters of Johnston County, North Carolina. Two of these, *Alasmidonta heterodon* and *Elliptio steinstansana*, are federal endangered species; 4 others are state endangered, and 4 are state threatened. Eleven of these species were observed during 2001 aquatic surveys of Johnston County (Table 2). One state endangered species: *Elliptio lanceolata* (status change effective July 1, 2002; LeGrand, Jr. et al. 2001), and three state threatened species: *Alasmidonta undulata*, *E. roanokensis*, and *Lampsilis radiata* (status change effective July 1, 2002) were found in these surveys (Figures 2a,b, and c). Seven additional species were found including *Pyganodon cataracta*, *Elliptio complanata* complex, *E. icterina* complex, *E. congaraea*, *E. cistelliformis*, *E. viridula*, and a lanceolate elliptio. North Carolina populations of *P. cataracta* are considered currently stable. The conservation status of the remaining elliptio species is undetermined at this time, primarily due to taxonomic uncertainty within the genus. Due to this uncertainty, some specimens were identified as *E. cistelliformis* based on shell characteristics rather than *E. complanata* complex.

*Elliptio complanata* complex and *E. icterina* complex (also recorded as *Elliptio* spp.) were the most commonly encountered native mussels, found in 5 systems: Black Creek, Middle Creek, and Swift Creek, Little River, and the main channel Neuse River. These species have previously been documented from 7 other systems: White Oak Creek, Little Creek, Hannah Creek, Mill Creek, Copper Branch, Cattail Creek, and Buffalo Creek. *Alasmidonta undulata* and *E. roanokensis* were found in 2 systems: Swift Creek and the Little River. *A. undulata* has been previously documented from 2 other systems: Middle Creek and Buffalo Creek. *E. roanokensis* has also been found in 2 other systems: Neuse River and Mill Creek. *Lampsilis radiata*, *Elliptio viridula*, and *Pyganodon cataracta* were found in the Little River. *L. radiata* was previously documented in 3 other systems: Swift Creek, Middle Creek, and Mill Creek. Documentation of the presence of *E. viridula* is complicated by taxonomic uncertainties within the genus however previous records of lanceolate elliptio species exist for 5 additional systems: Mill Creek, Middle Creek, Swift Creek, Cattail Creek, and Buffalo Creek. *P. cataracta* has been observed in three additional systems: Middle Creek, Swift Creek, and White Oak Creek. *Elliptio lanceolata* was found only in Swift Creek. This species has been previously documented from Middle Creek, Mill Creek and the Little River.

As noted above, records exist for eight additional species in Johnston County (Table 3). Extensive surveys of the Swift Creek and Little River subbasins have been undertaken in recent years and many records were produced in these earlier surveys. *Alasmidonta heterodon* has been found in 5 systems: Little River, Buffalo Creek, Swift Creek, Middle Creek, and White Oak Creek. Records of *Utterbackia imbecillis* come from 4 systems: Moccasin Creek, Little River, Swift Creek, and White Oak Creek. *Fusconaia masoni* and *Strophitus undulatus* have been documented from 3 systems: Middle Creek, Swift Creek, and the Little River. *Villosa constricta* has been found in the Little River and Swift Creek. There are records of *Elliptio steinstansana*



and *Lampsilis cariosa* from the Little River and *Lasmigona subviridis* was found in Swift Creek. The Little River population of *E. steinstansana* is the only known occurrence of this species outside of the Tar River Basin.

The most diverse mussel fauna observed in 2001 surveys was in the Little River with 8 species: *Alasmidonta undulata*, *Elliptio complanata* complex, *E. icterina* complex, *E. roanokensis*, *E. viridula*, *lanceolate elliptio*, *Lampsilis radiata*, and *Pyganodon cataracta* (Table 2). The record for *E. roanokensis* is new for this system. Seven other species have been recorded from the Little River in Johnston Co.: *A. heterodon*, *E. steinstansana*, *Fusconaia masoni*, *L. cariosa*, *Strophitus undulatus*, *Utterbackia imbecillis*, and *Villosa constricta* (Table 3). *Lasmigona subviridis* is also known from the Little River within Wake County. Buffalo Creek, a tributary of the Little River, supports 6 species including *A. heterodon*. The total known freshwater mussel diversity for the Little River Subbasin is 16 species.

Swift Creek has the second most diverse mussel fauna in the county with 6 species recorded in 2001 surveys: *Alasmidonta undulata*, *Elliptio complanata*, *E. congaraea*, *E. icterina* complex, *E. lanceolata*, and *E. roanokensis* (Table 2). An additional 9 species have been recorded from Swift Creek and its tributaries in previous surveys: *A. heterodon*, *Strophitus undulatus*, *Lampsilis radiata*, *Fusconaia masoni*, *Utterbackia imbecillis*, *Pyganodon cataracta*, *Lasmigona subviridis*, *Villosa constricta*, and *lanceolate elliptio* (Table 3). Total known freshwater mussel diversity in the Swift Creek Subbasin is 15 species.

Despite extensive habitat degradation in Johnston County, the Neuse River continues to support several species of freshwater mussels. Recent surveys at NC 42 and through the Let 'Lones area produced records of *Alasmidonta undulata*, *Strophitus undulatus*, *E. complanata* complex, *E. congaraea*, *E. icterina* complex, *E. roanokensis*, and *Lampsilis radiata* (J.M. Alderman, NCWRC, personal communication and Table 3).

## Crayfishes Results & Discussion

The overall diversity of crayfishes in this system was fair, containing at least 5 native species collected during our inventory: *Cambarus (Depressicambarus) latimanus* (LeConte, 1856), *Cambarus (Puncticambarus)* sp. C (a member of a species complex related to *Cambarus (P.) acuminatus* Faxon, 1884 that is currently being described by J.E. Cooper, NC State Museum of Natural Sciences), *Orconectes (Procericambarus) carolinensis* Cooper and Cooper, 1995, *Procambarus (Ortmannicus) acutus* (Girard, 1852), and a species that is either *P. (O.) medialis* Hobbs, 1975, *P. (O.) plumimanus* Hobbs and Walton, 1958, or an undescribed relative. *Orconectes carolinensis* is state listed special concern, and *Procambarus medialis* and *P. plumimanus* are on a watch list in North Carolina (statuses effective 1 July, 2002; LeGrand, Jr. et al. 2001). The conservation statuses of the other two native species are considered stable throughout their ranges.

*Procambarus acutus* was well distributed throughout the surveyed areas, occurring at 18 sites (Table 2), and ranged from uncommon to common in abundance at each site. *Cambarus latimanus*, *C. sp. C*, *Orconectes carolinensis*, and *Procambarus medialis/plumimanus* were less well distributed, occurring at only 3, 4, 2, and 1 sites, respectively (Table 2, Figure 2). *Cambarus latimanus* and *Orconectes carolinensis* were each historically collected from 1



additional site, and *Procambarus medialis* was collected from 2 additional sites historically. *Procambarus acutus* was the only species to occur alone (14 sites). *Cambarus* sp. C and *P. medialis/plumimanus* occurred only with *P. acutus*, and *Cambarus latimanus* occurred with *P. acutus* and *Orconectes carolinensis*. No crayfish were collected at 4 sites. Abundances of the less widespread species were uncommon except *P. medialis/ plumimanus*, which was fairly common, although patchy, at the site where it was collected. Recent reproduction was evident for all species. Carapace lengths (mm) for each species are as follows (mean  $\pm$  SD, min, max, in mm): *C. latimanus*: 7.0  $\pm$  0.9, 5.9, 9.0; *C. sp. C.*: 22.1  $\pm$  7.7, 17.0, 31.0; *O. carolinensis*: 22.5  $\pm$  3.9, 17.0, 31.0; *P. acutus*: 15.1  $\pm$  7.7, 6.0, 44.2; *P. medialis/ plumimanus*: 18.7  $\pm$  4.6, 8.5, 22.1. *Palaemonetes paludosus* (freshwater shrimp) was also collected from 18 sites.

During our survey, we found 5 of the 9+ native species historically known to occur in the Neuse River Basin. At least 4 species that we did not find, but that occur in this river basin, are *Cambarus* (*Cambarus*) *davidi* Cooper, 2000, *C. (D.) reduncus* Hobbs, 1956, *C. (Lacunicambarus) diogenes* Girard, 1852, and *Fallicambarus (Creaserinus) fodiens* (Cottle, 1863). *Cambarus davidi* and *C. reduncus* occur farther upstream in this river basin, and may not occur in the area where our survey was conducted. These 2 species, as well as *Cambarus diogenes* and *F. fodiens*, are burrowing species and may occur in the area but our survey did not use methods designed to find burrowers. This inventory has helped to establish the continued presence of several rare species in the area, and further clarify distribution boundaries of several species in the Neuse River Basin.

## Fishes Results & Discussion

Of the 28 sites surveyed, 25 were surveyed in some manner for freshwater fishes, and they were collected or observed at all 25 localities (Table 2). Sites 2, 5a-d, and 22a-h were predominantly surveyed for mussels and are excluded from the results reported herein. Forty-five species representing 15 families were documented during the Johnston County aquatic inventory (Table 4). No new species records were noted for the 74 species that have been documented in Johnston County (Menhinick 1991; NC State Museum of Natural Sciences, pers. com.). Limitations as to our access of all available habitats and sampling range within the county were the most likely reasons for the absence of particular species and limited species' range and abundance. Overall, the waterways of Johnston County contain a moderate to high diversity of fish species given its location within both the Piedmont and Coastal Plain, and the presence of large rivers and streams such as the Neuse and Little rivers and Swift Creek. It is possible though that effects from urbanization are impacting this diversity since Johnston County has seen a 50% population increase since 1990. The ability of the county to maintain much of its rural character and preserve open space may have limited these impacts in some areas. Comparisons to other inventories of the county are limited due to the lack of recent surveys. However, our comparisons to Menhinick (1991) reflect that the species composition reported herein is representative of the area.

For purposes of this report, *Etheostoma nigrum* (johnny darter) and *E. olmstedii* (tessellated darter) specimens were identified together (Table 4). The fall line typically represents the divide between the 2 species with the johnny darter to the north and the tessellated darter to the south, but there is an area of intermixing between the species. Since we did not preserve specimens for laboratory identification and the only way to truly differentiate the species is to examine



individuals for a complete or incomplete infraorbital canal after applying a dye, we could not provide a definite identification for each specimen.

Also in  
Swift Cr  
Moccasin Cr

Significant species found during the survey include *Lythrurus matutinus* (pinewoods shiner), which is currently noted as a significantly rare species by the Natural Heritage Program and is a federal species of concern (LeGrand, Jr. et al. 2001). Specimens of the pinewoods shiner were collected from 2 sites on each Swift Creek and Little River. Historically, this species has been noted in both of these waterways (Menhinick 1991), so it appears that these populations may still be stable. However, quantitative surveys need to be conducted to clearly determine the pinewoods shiner's stability within the county. Likewise, the Neuse River Basin population of *Noturus furiosus* (Carolina madtom) is currently state listed special concern (LeGrand, Jr. et al. 2001) and has been historically documented within Johnston County (Menhinick 1991, Burr and Lee 1985). However, we surveyed 10 sites at these or proximal locations within the same waterways and no Carolina madtom specimens were collected or seen. Given the urbanization impacts that have been ongoing in Wake County over the past few decades and the 50% population increase in Johnston County over the past decade, it is probable that the relatively sensitive and specialized Carolina madtom has been negatively impacted leading to a significant decline in its population numbers and distribution. Since this species is endemic to the Neuse River and Tar River basins and the Little River was noted as harboring the largest extant population within the entire Neuse River Basin (Burr and Lee 1985), any significant decline in this subpopulation could be devastating for the future success and survival of the species.

While no additional threatened or endangered fish species was collected during the survey of Johnston County, continual research and status surveys are needed to determine the present status of each species. Current land management practices, including agriculture and urbanization, are having an effect on the fish fauna in North Carolina. As nongame biologists, we need to identify, which species are at risk and identify ways to reduce or eliminate the impacts.

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**Table 1.** Map numbers and corresponding sites surveyed for the Johnston County aquatic inventory, 2001 (see Figure 1). Records of animals observed at each site are detailed in Table 2, and those collected historically (prior to 2001; sites not listed here) are detailed in Table 3.

<u>Waterway @ Road</u>	<u>Site no.</u>	<u>Map #</u>
Bawdy Creek @ SR 2523	011016.5ahf, 011128.5btw	20
Black Creek @ NC 210	011119.1jaj	2
Black Creek @ SR 1309	011025.3ahf, 011102.2btw	3
Black Creek @ SR 1330	011017.6ahf, 011102.3btw	13
Buffalo Creek @ NC 39	011016.2ahf, 011105.4btw	24
Buffalo Creek @ SR 1700	011016.1ahf	23
Hannah Creek @ SR 1150	011017.4ahf, 011128.2btw	15
Hannah Creek @ SR 1159	011017.5ahf, 011128.1btw	14
Little Creek @ SR 1562	011025.6ahf, 011105.3btw	7
Little River @ NC 96	010530.1-4jaj, 010531.1-4jaj	22a-h
Little River @ SR 1002	010828.1-4jaj, 010828.1btw	28a-e
Little River @ SR 1934	011016.3ahf	26
Little River @ SR 2130	011105.5btw	25
Little River @ SR 2320	010725.1-6jaj, 010828.2btw	27a-g
Middle Creek @ NC 210	011025.1ahf, 011102.5btw	9
Middle Creek @ NC 50	011025.4ahf, 011102.1btw	1
Middle Creek @ SR 1504	011102.4btw	12
Middle Creek @ SR 1507	011025.2ahf	11
Mill Creek @ SR 1124	011017.1ahf	16
Mill Creek @ SR 1185	011017.3ahf, 011128.4btw	18
Mill Creek @ SR 1201	011016.6ahf	21
Polecat Branch @ SR 1007	011016.4ahf, 011128.6btw	19
Stone Creek @ SR 1138	011017.2ahf, 011128.3btw	17
Swift Creek @ NC 210	010802.2btw	10
Swift Creek @ SR 1501	011128.7btw	8
Swift Creek @ SR 1525	011025.5ahf, 011105.1btw	4
Swift Creek @ SR 1555 to SR 1643	010921.1-4jaj	5a-d
Swift Creek @ SR 1562	011105.2btw	6

**Table 2.** Freshwater mussels, clams, crayfishes, limpets, snails, and fishes found during the aquatic inventory of Johnston County, 2001. Records where "none" was recorded indicate that no animals were observed during the search period, but does not necessarily mean that animals do not occur at the site. Substrates, where given, are defined as follows, with dominant substrates capitalized: b=bedrock, b=boulder, c=clay, co=cobble, d=detritus, g=gravel, m=mud, p=pebble, r=roots, s=silt, sa=sand, v=vegetation.

Location		Substrate		Search	
Site (date) and species			Technique	Time	# Live # Shells
<u>Bawdy Creek @ SR 2523</u>					
<u>clam</u>					
011016.5ahf	none (n/a)	s,d,m	dipnet/visual	1h	
<u>crayfish</u>					
011016.5ahf	Cambarus (Depressicambarus) latimanus (n/a)	s,d,m	dipnet	1h	5
011016.5ahf	Procambarus (Ortmannicus) acutus (White River crayfish)	s,d,m	dipnet	1h	15
<u>fish</u>					
011016.5ahf	Aphredoderus sayanus (pirate perch)	s,d,m	dipnet	1h	
011016.5ahf	Chologaster cornuta (swampfish)	s,d,m	dipnet	1h	2
011016.5ahf	Elassoma zonatum (banded pygmy sunfish)	s,d,m	dipnet	1h	
011016.5ahf	Emmeacanthus gloriosus (bluespotted sunfish)	s,d,m	dipnet	1h	3
011016.5ahf	Etheostoma serrifer (sawcheek darter)	s,d,m	dipnet	1h	5
011016.5ahf	Gambusia holbrooki (eastern mosquitofish)	s,d,m	dipnet	1h	
011016.5ahf	Micropterus salmoides (largemouth bass)	s,d,m	dipnet	1h	1
011016.5ahf	Umbra pygmaea (eastern mudminnow)	s,d,m	dipnet	1h	5
<u>snail</u>					
011016.5ahf	Physella sp. (physa snail)	s,d,m	dipnet/visual	1h	3
<u>Bawdy Creek @ SR 2523-</u>					
<u>fish</u>					
011128.5btw	Aphredoderus sayanus (pirate perch)		electroshock	328s	2
011128.5btw	Chaenobrytus gulosus (warmouth)		electroshock	328s	1
011128.5btw	Emmeacanthus gloriosus (bluespotted sunfish)		electroshock	328s	4
011128.5btw	Etheostoma serrifer (sawcheek darter)		electroshock	328s	1
011128.5btw	Lepomis gibbosus (pumpkinseed)		electroshock	328s	1
011128.5btw	Lepomis macrochirus (bluegill)		electroshock	328s	4
011128.5btw	Notemigonus crysoleucas (golden shiner)		electroshock	328s	1
011128.5btw	Umbra pygmaea (eastern mudminnow)		electroshock	328s	2



Location	Site (date) and species	Substrate	Technique	Time	# Live	# Shells
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#### Black Creek @ NC 210

##### muscle

011119.1jaj Elliptio spp. (n/a)

#### Black Creek @ SR 1309

##### clam

011025.3ahf Musculium partumeium (swamp fingernailclam)

011025.3ahf Musculium securis (pond fingernailclam)

##### crayfish

011025.3ahf none (n/a)

##### fish

011025.3ahf Ameiurus natalis (yellow bullhead?)

011025.3ahf Chologaster cornuta (swampfish)

011025.3ahf Elasmoma zonatum (banded pygmy sunfish)

011025.3ahf Enneacanthus gloriosus (bluespotted sunfish)

011025.3ahf Etheostoma fusiforme (swamp darter)

011025.3ahf Etheostoma serrifer (sawcheek darter)

011025.3ahf Gambusia holbrooki (eastern mosquitofish)

##### shrimp

011025.3ahf Palaemonetes paludosus (freshwater shrimp)

##### snail

011025.3ahf Campeloma decisum (pointed campeloma)

011025.3ahf Micromenetus dilatatus (bugle sprite)

011025.3ahf Physella sp. (physa snail)

011025.3ahf Pseudosuccinea columella (mimic lymnaea)

#### Black Creek @ SR 1309-

##### fish

011102.2btw Anguilla rostrata (American eel)

011102.2btw Aphredoderus sayanus (pirate perch)

011102.2btw Centrarchus macropterus (flier)

011102.2btw Enneacanthus gloriosus (bluespotted sunfish)

011102.2btw Erimyzon oblongus (creek chubsucker)

011102.2btw Esox americanus (redfin pickerel)

011102.2btw Etheostoma fusiforme (swamp darter)

011102.2btw Gambusia holbrooki (eastern mosquitofish)

011102.2btw Lepomis macrochirus (bluegill)

tactile 0.17h 10

dipnet 1h 6

dipnet 1h

dipnet 1h

dipnet 1h 1

dipnet 1h 6

dipnet 1h 10

dipnet 1h 3

dipnet 1h 1

dipnet 1h 3

dipnet 1h

dipnet 1h

dipnet 1h

dipnet 1h 1

dipnet 1h

dipnet 1h

electroshock

1

electroshock

3

electroshock

1

electroshock

2

electroshock

1

electroshock

1

electroshock

1

electroshock

3

Location	Site (date) and species	Substrate	Technique	Search Time	# Live # Shells
<u>snail</u>	011102.2btw Campeloma decisum (pointed campeloma)		dipnet/visual		1
<u>clam</u>	011017.6ahf Corbicula fluminea (Asian clam)	s,sa,C,PP,v,d,m	dipnet/visual	0.83h	
<u>crayfish</u>	011017.6ahf Procambarus (Ortmannicus) acutus (White River crayfish)	s,sa,C,PP,v,d,m	dipnet/visual	0.83h	3
<u>fish</u>	011017.6ahf Aphredoderus sayanus (pirate perch)	s,sa,C,PP,v,d,m	dipnet	0.83h	
	011017.6ahf Elasmoma zonatum (banded pygmy sunfish)	s,sa,C,PP,v,d,m	dipnet	0.83h	
	011017.6ahf Enneacanthus gloriosus (bluespotted sunfish)	s,sa,C,PP,v,d,m	dipnet	0.83h	
	011017.6ahf Etheostoma serrifer (sawcheek darter)	s,sa,C,PP,v,d,m	dipnet	0.83h	
	011017.6ahf Gambusia holbrooki (eastern mosquitofish)	s,sa,C,PP,v,d,m	dipnet	0.83h	
	011017.6ahf Noturus sp. (marginated or tapole madtom)	s,sa,C,PP,v,d,m	dipnet	0.83h	
	011017.6ahf Umbra pygmaea (eastern mudminnow)	s,sa,C,PP,v,d,m	dipnet	0.83h	
<u>muscle</u>	011017.6ahf Elliptio complanata (eastern Elliptio)	s,sa,C,PP,v,d,m	dipnet/visual	0.83h	2
<u>shrimp</u>	011017.6ahf Palaemonetes paludosus (freshwater shrimp)	s,sa,C,PP,v,d,m	dipnet	0.83h	
<u>snail</u>	011017.6ahf Physella sp. (physa snail)	s,sa,C,PP,v,d,m	dipnet	0.83h	
	011017.6ahf Pseudosuccinea columella (minic lynnaea)	s,sa,C,PP,v,d,m	dipnet	0.83h	2
<u>fish</u>	011102.3btw Amia calva (bowfin)		electroshock	577s	1
	011102.3btw Anguilla rostrata (American eel)		electroshock	577s	1
	011102.3btw Aphredoderus sayanus (pirate perch)		electroshock	577s	2
	011102.3btw Centrarchus macropterus (flier)		electroshock	577s	1
	011102.3btw Erimyzon oblongus (creek chubsucker)		electroshock	577s	
	011102.3btw Esoc americanus (redfin pickerel)		electroshock	577s	4
	011102.3btw Gambusia holbrooki (eastern mosquitofish)		electroshock	577s	
	011102.3btw Lepomis auritus (redbreast sunfish)		electroshock	577s	3
	011102.3btw Lepomis gibbosus (pumpkinseed)		electroshock	577s	2
	011102.3btw Lepomis macrochirus (bluegill)		electroshock	577s	3
	011102.3btw Umbra pygmaea (eastern mudminnow)		electroshock	577s	1



## Location

Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
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mussel

011102.3btw Elliptio complanata (eastern Elliptio)

2

snail

011102.3btw Pseudosuccinea columella (mimic lymnaea)

1

Buffalo Creek @ NC 39clam

011016.2ahf Corbicula fluminea (Asian clam)

1h

011016.2ahf Musculium sp. (partumeium?) (n/a)

1h

011016.2ahf Pisidium casertanum (ubiquitous peaclam)

1h

011016.2ahf Pisidium equilaterale (round peaclam)

1h

crayfish

011016.2ahf Procambarus (Ortmannicus) acutus (White River crayfish)

1h

11

fish

011016.2ahf Aphredoderus sayanus (pirate perch)

1h

1

011016.2ahf Chaenobryttus gulosus (warmouth)

1h

1

011016.2ahf Emecanthus gloriosus (bluespotted sunfish)

1h

1

011016.2ahf Etheostoma serrifer (sawcheek darter)

1h

1

011016.2ahf Gambusia holbrooki (eastern mosquito fish)

1h

1

011016.2ahf Notropis procne (swallowtail shiner)

1h

limpet

011016.2ahf Laevapex fuscus (dusky ancyloid)

1h

shrimp

011016.2ahf Palaemonetes paludosus (freshwater shrimp)

1h

snail

011016.2ahf Campeloma decisum (pointed campeloma)

1h

6

011016.2ahf Helisoma anceps (two-ridge rams-horn)

1h

2

011016.2ahf Hydrobiidae (hydrobiid)

1h

1

011016.2ahf Micromenetus dilatatus (bugle sprite)

1h

3

011016.2ahf Physella sp. (physa snail)

1h

1

011016.2ahf Pseudosuccinea columella (mimic lymnaea)

1h

Buffalo Creek @ NC 39+fish

011105.4btw Ameiurus platycephalus (flat bullhead)

323s

1

011105.4btw Anguilla rostrata (American eel)

323s

1

011105.4btw Erimyzon oblongus (creek chubsucker)

323s

2

011105.4btw Gambusia holbrooki (eastern mosquito fish)

323s

1

011105.4btw Lepomis auritus (redbreast sunfish)

323s

1

Location	Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
<u>mussel</u>			visual			1
	011105.4bw Elliptio cistelliformis (box spike)					
<u>shrimp</u>			electroshock	323s		
	011105.4bw Palaemonetes paludosus (freshwater shrimp)					
<u>Buffalo Creek @ SR 1700</u>						
<u>clam</u>						
	011016.1ahf Musculium partumeium (swamp fingernailclam)	s,v,d,M	dipnet	1h		
<u>crayfish</u>						
	011016.1ahf Procambarus (Ortmannicus) acutus (White River crayfish)	s,v,d,M	dipnet	1h	5	
<u>fish</u>						
	011016.1ahf Chaenobrytus gulosus (warmouth)	s,v,d,M	dipnet	1h		
	011016.1ahf Etheostoma fusiforme (swamp darter)	s,v,d,M	dipnet	1h		
	011016.1ahf Gambusia holbrooki (eastern mosquitofish)	s,v,d,M	dipnet	1h		
	011016.1ahf Lepomis macrochirus (bluegill)	s,v,d,M	dipnet	1h		
<u>limpet</u>						
	011016.1ahf Laevapex fuscus (dusky ancyloid)	s,v,d,M	dipnet	1h		
<u>shrimp</u>						
	011016.1ahf Palaemonetes paludosus (freshwater shrimp)	s,v,d,M	dipnet	1h		
<u>snail</u>						
	011016.1ahf Campeloma decisum (pointed campeloma)	s,v,d,M	dipnet	1h	3	
	011016.1ahf Hydrobiidae (hydrobiid)	s,v,d,M	dipnet	1h		
	011016.1ahf Micromenetus dilatatus (bugle sprite)	s,v,d,M	dipnet	1h		
	011016.1ahf Physella sp. (physa snail)	s,v,d,M	dipnet	1h	3	
	011016.1ahf Pseudosuccinea columella (mimic lymnaea)	s,v,d,M	dipnet	1h	5	
<u>Hannah Creek @ SR 1150</u>						
<u>clam</u>						
	011017.4ahf Musculium sp. (n/a)	s,C,v,d,m	dipnet	1h		
<u>crayfish</u>						
	011017.4ahf Procambarus (Ortmannicus) acutus (White River crayfish)	s,C,v,d,m	dipnet/visual	1h	8	
<u>fish</u>						
	011017.4ahf Aphredoderus sayanus (pirate perch)	s,C,v,d,m	dipnet	1h		
	011017.4ahf Elasmoma zonatum (banded pygmy sunfish)	s,C,v,d,m	dipnet	1h		
	011017.4ahf Etheostoma fusiforme (swamp darter)	s,C,v,d,m	dipnet	1h	3	
	011017.4ahf Etheostoma serifer (sawcheek darter)	s,C,v,d,m	dipnet	1h	1	



Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<u>fish</u>						
	011017.4ahf Lepomis auritus (redbreast sunfish)	s,C,v,d,m	dipnet	1h	1	
	011017.4ahf Noturus gyrinus (tadpole madtom)	s,C,v,d,m	dipnet	1h	4	
	011017.4ahf Umbra pygmaea (eastern mudminnow)	s,C,v,d,m	dipnet	1h	2	
<u>muscle</u>						
	011017.4ahf lanceolate Elliptio (lance)	s,C,v,d,m	visual	1h	5	
<u>shrimp</u>						
	011017.4ahf Palaemonetes paludosus (freshwater shrimp)	s,C,v,d,m	dipnet/visual	1h		
<u>snail</u>						
	011017.4ahf Hydrobiidae (hydrobiid)	s,C,v,d,m	dipnet	1h		
	011017.4ahf Physella sp. (physa snail)	s,C,v,d,m	dipnet/visual	1h		
<u>Hannah Creek @ SR 1150-</u>						
<u>crayfish</u>						
	011128.2btw Burrow(s) (n/a)		visual			
	011128.2btw Procambanus (Ortmannicus) acutus (White River crayfish)		electroshock	375s		
<u>fish</u>						
	011128.2btw Anguilla rostrata (American eel)		electroshock	375s		
	011128.2btw Aphredoderus sayanus (pirate perch)		electroshock	375s	3	
	011128.2btw Chaenobrytus gulosus (warmouth)		electroshock	375s	2	
	011128.2btw Elasmoma zonatum (banded pygmy sunfish)		electroshock	375s	1	
	011128.2btw Erimyzon oblongus (creek chubsucker)		electroshock	375s	4	
	011128.2btw Etheostoma serrifer (sawcheck darter)		electroshock	375s	1	
	011128.2btw Lepomis auritus (redbreast sunfish)		electroshock	375s	1	
	011128.2btw Lepomis macrochirus (bluegill)		electroshock	375s	5	
<u>shrimp</u>						
	011128.2btw Palaemonetes paludosus (freshwater shrimp)		electroshock	375s		
<u>Hannah Creek @ SR 1159</u>						
<u>clam</u>						
	011017.5ahf Musculium partumeium (swamp fingernailclam)	s,sa,C,d,m	dipnet/visual	1h		
	011017.5ahf Pisidium adamsi (Adam peaclam)	s,sa,C,d,m	dipnet/visual	1h		
<u>crayfish</u>						
	011017.5ahf Procambanus (Ortmannicus) acutus (White River crayfish)	s,sa,C,d,m	dipnet/visual	1h	8	0
<u>fish</u>						
	011017.5ahf Aphredoderus sayanus (pirate perch)	s,sa,C,d,m	dipnet	1h	6	
	011017.5ahf Elasmoma zonatum (banded pygmy sunfish)	s,sa,C,d,m	dipnet	1h		

Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<u>fish</u>						
	011017.5ahf Esox americanus (redfin pickerel)	s,sa,C,d,m	dipnet	1h	1	
	011017.5ahf Etheostoma fusiforme (swamp darter)	s,sa,C,d,m	dipnet	1h	2	
	011017.5ahf Etheostoma serifer (sawcheek darter)	s,sa,C,d,m	dipnet	1h	10	
	011017.5ahf Gambusia holbrooki (eastern mosquitofish)	s,sa,C,d,m	dipnet	1h		
	011017.5ahf Umbra pygmaea (eastern mudminnow)	s,sa,C,d,m	dipnet	1h	13	
<u>shrimp</u>						
	011017.5ahf Palaemonetes paludosus (freshwater shrimp)	s,sa,C,d,m	dipnet/visual	1h		
<u>snail</u>						
	011017.5ahf Hydrobiidae (hydrobiid)	s,sa,C,d,m	dipnet/visual	1h		
	011017.5ahf Physella sp. (physa snail)	s,sa,C,d,m	dipnet/visual	1h		
Hannah Creek @ SR 1159-						
<u>clam</u>						
	011128.1btw Musculium partumeium (swamp fingernailclam)		dipnet			
	011128.1btw Pisidium adamsi (Adam peaclam)		dipnet			
<u>crayfish</u>						
	011128.1btw Procambanus (Ortmannicus) acutus (White River crayfish)		electroshock	278s		
<u>fish</u>						
	011128.1btw Ameiurus sp. (bullhead)		visual		1	
	011128.1btw Anguilla rostrata (American eel)		electroshock	278s		
	011128.1btw Aphrododerus sayanus (pirate perch)		electroshock	278s	2	
	011128.1btw Emmeacanthus gloriosus (bluespotted sunfish)		electroshock	278s	1	
	011128.1btw Erimyzon oblongus (creek chubsucker)		electroshock	278s	2	
	011128.1btw Etheostoma fusiforme (swamp darter)		electroshock	278s	1	
	011128.1btw Etheostoma serifer (sawcheek darter)		electroshock	278s	1	
	011128.1btw Gambusia holbrooki (eastern mosquitofish)		electroshock	278s	1	
	011128.1btw Lepomis auritus (redbreast sunfish)		electroshock	278s	3	
	011128.1btw Lepomis macrochirus (bluegill)		electroshock	278s	2	
	011128.1btw Noturus gyrinus (tadpole madtom)		electroshock	278s	2	
<u>snail</u>						
	011128.1btw Hydrobiidae (hydrobiid)		dipnet/visual			
	011128.1btw Physella sp. (physa snail)		dipnet/visual			
Little Creek @ SR 1562						
<u>clam</u>						
	011025.6ahf Corbicula fluminea (Asian clam)	Sa,d,m	dipnet	0.73h		



# Location

Location	Site (date) and species	Substrate	Technique	Time	# Live	# Shells
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## crayfish

011025.6ahf Procambatus (Ortmannicus) acutus (White River crayfish)

## fish

011025.6ahf Aphredoderus sayanus (pirate perch)

011025.6ahf Etheostoma fusiforme (swamp darter)

011025.6ahf Etheostoma nigrum/olmstedii (johnny/tessellated darter)

011025.6ahf Gambusia holbrooki (eastern mosquitofish)

011025.6ahf Lepomis macrochirus (bluegill)

## shrimp

011025.6ahf Palaemonetes paludosus (freshwater shrimp)

## snail

011025.6ahf Micromenetus dilatatus (bugle sprite)

## Little Creek @ SR 1562-/+

## fish

011105.3btw Anguilla rostrata (American eel)

011105.3btw Cyprinella analostana (satinfin shiner)

011105.3btw Esoc americanus (redfin pickerel)

011105.3btw Gambusia holbrooki (eastern mosquitofish)

011105.3btw Lepomis auritus (redbreast sunfish)

011105.3btw Lepomis gibbosus (pumpkinseed)

011105.3btw Lepomis macrochirus (bluegill)

011105.3btw Notropis procerus (swallowtail shiner)

## shrimp

011105.3btw Palaemonetes paludosus (freshwater shrimp)

## Little River @ NC 96

## clam

010530.1jaj Corbicula fluminea (Asian clam)

010530.2jaj Corbicula fluminea (Asian clam)

010530.3jaj Corbicula fluminea (Asian clam)

010530.4jaj Corbicula fluminea (Asian clam)

010531.1jaj Corbicula fluminea (Asian clam)

010531.3jaj Corbicula fluminea (Asian clam)

## mussel

010530.3jaj Alasmidonta undulata (triangle floater)

010530.4jaj Alasmidonta undulata (triangle floater)

s,sa,g,r,d

S,Sa,C,g,R,d

S,Sa,C,co,b,G,r,d

S,Sa,c,g,r,d

S,Sa,c,g,r,d

C,S,sa,g,d,R,bo

S,Sa,C,co,b,G,r,d

S,Sa,c,g,r,d

# Location

## Site (date) and species

## Substrate

## Technique

## Search Time

## # Live # Shells

### mussel

010531.1jaj	Alasmidonta undulata (triangle floater)	S,Sa,c,g,r,d	tactile/visual	1.12h	1	
010530.1jaj	Elliptio complanata (eastern Elliptio)	s,sa,g,r,d	visual/tactile	1.03h	11	
010530.1jaj	Elliptio icterina (variable spike)	s,sa,g,r,d	visual/tactile	1.03h	1	
010530.2jaj	Elliptio spp. (n/a)	S,Sa,C,g,R,d	tactile	1.08h	277	
010530.3jaj	Elliptio spp. (n/a)	S,Sa,C,co,b,G,r,d	tactile	0.45h	66	
010530.4jaj	Elliptio spp. (n/a)	S,Sa,c,g,r,d	tactile/visual		25	
010531.1jaj	Elliptio spp. (n/a)	S,Sa,c,g,r,d	tactile/visual	1.12h	74	
010531.2jaj	Elliptio spp. (n/a)	C,S,sa,co,R	tactile	0.88h	132	
010531.3jaj	Elliptio spp. (n/a)	C,S,sa,g,d,R,bo	tactile		66	
010530.3jaj	Elliptio viridula (green lance)	S,Sa,C,co,b,G,r,d	visual	0.45h	1	
010530.4jaj	Elliptio viridula (green lance)	S,Sa,c,g,r,d	tactile/visual		2	
010531.1jaj	Elliptio viridula (green lance)	S,Sa,c,g,r,d	tactile/visual	1.12h	15	
010531.3jaj	Elliptio viridula (green lance)	C,S,sa,g,d,R,bo	tactile		3	

### snail

010530.2jaj	Campeloma decusum (pointed campeloma)	S,Sa,C,g,R,d	tactile/visual	1.08h		
010530.3jaj	Campeloma decusum (pointed campeloma)	S,Sa,C,co,b,G,r,d	tactile/visual	0.45h		
010530.4jaj	Campeloma decusum (pointed campeloma)	S,Sa,c,g,r,d	tactile/visual			

## Little River @ SR 1002

### clam

010828.1jaj	Corbicula fluminea (Asian clam)	C,S,Sa,g,co,bo	visual			
010828.2jaj	Corbicula fluminea (Asian clam)	s,Sa,G,co,bo,v	visual	0.87h		
010828.3jaj	Corbicula fluminea (Asian clam)	C,Sa,G,bo	visual	0.67h		
010828.4jaj	Corbicula fluminea (Asian clam)	sa,g,Co,Bo	visual	0.83h		

### crayfish

010828.4jaj	Cambarus sp. (n/a)	sa,g,Co,Bo	visual	0.83h		
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### fish

010828.4jaj	Etheostoma sp. (n/a)	sa,g,Co,Bo	visual	0.83h		
010828.4jaj	Lepomis sp. (n/a)	sa,g,Co,Bo	visual	0.83h		

### mussel

010828.1jaj	Elliptio cistelliformis (box spike)	C,S,Sa,g,co,bo	visual		80	
010828.1jaj	Elliptio complanata (eastern Elliptio)	C,S,Sa,g,co,bo	visual		4	
010828.2jaj	Elliptio complanata (eastern Elliptio)	s,Sa,G,co,bo,v	visual	0.87h		
010828.3jaj	Elliptio complanata (eastern Elliptio)	C,Sa,G,bo	visual	0.67h		2
010828.1jaj	Elliptio icterina (variable spike)	C,S,Sa,g,co,bo	visual		3	
010828.2jaj	Elliptio roanokensis (Roanoke slabshell)	s,Sa,G,co,bo,v	visual	0.87h		2



Site (date) and species	Substrate	Technique	Time	# Live	# Shells
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mussel

010828.1jaj Lampsilis radiata (eastern lampmussel)	C,S,Sa,g,co,bo	visual		5	
010828.1jaj lanceolate Elliptio (lance)	C,S,Sa,g,co,bo	visual			3
010828.4jaj none (n/a)	sa,g,Co,Bo	visual	0.83h		
010828.1jaj Pyganodon cataracta (eastern floater)	C,S,Sa,g,co,bo	visual		3	
010828.1jaj Unknown (n/a)	C,S,Sa,g,co,bo	visual		2	

snail

010828.1jaj Campeloma decisum (pointed campeloma)	C,S,Sa,g,co,bo	visual			
010828.2jaj Campeloma decisum (pointed campeloma)	s,Sa,G,co,bo,v	visual	0.87h		
010828.2jaj Helisoma anceps (two-ridge rams-horn)	s,Sa,G,co,bo,v	visual	0.87h		
010828.3jaj Micromenetus dilatatus (bugle sprite)	C,Sa,G,bo	visual	0.67h		
010828.2jaj Physella sp. (physa snail)	s,Sa,G,co,bo,v	visual	0.87h		

Little River @ SR 1002 +clam

010828.1btw Corbicula fluminea (Asian clam)		dipnet/viewscope	1.25h		
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crayfish

010828.1btw Cambarus (Puncticambarus) sp. C (n/a)		dipnet/visual/viewscope	1.25h	1	
010828.1btw Procamburus (Ortmannicus) acutus (White River crayfish)		dipnet/visual/viewscope	1.25h	2	

fish

010828.1btw Alosa sapidissima		visual/electroshock	649s		
010828.1btw Ameiurus sp. (bullhead)		visual/electroshock	649s		
010828.1btw Anguilla rostrata (American eel)		visual/electroshock	649s		
010828.1btw Cyprinella analostana (satinfin shiner)		visual/electroshock	649s		
010828.1btw Etheostoma nigrum/olmstedii (johnny/tesselated darter)		visual/electroshock	649s		
010828.1btw Etheostoma vitreum (glassy darter)		visual/electroshock	649s		
010828.1btw Lepisosteus osseus (longnose gar)		visual/electroshock	649s		
010828.1btw Lepomis auritus (redbreast sunfish)		visual/electroshock	649s		
010828.1btw Lepomis macrochirus (bluegill)		visual/electroshock	649s		
010828.1btw Lythrurus matutinus (pinewoods shiner)		visual/electroshock	649s		
010828.1btw Micropterus salmoides (largemouth bass)		visual/electroshock	649s		
010828.1btw Nocomis leptocephalus (bluehead chub)		visual/electroshock	649s		
010828.1btw Notropis procne (swallowtail shiner)		visual/electroshock	649s		
010828.1btw Luxilus albeolus (white shiner)		visual/electroshock	649s		
010828.1btw Noturus insignis (margined madtom)		visual/electroshock	649s		
010828.1btw Percina roanoka (Roanoke darter)		visual/electroshock	649s		

Location		Site (date) and species	Substrate	Technique	Time	# Live	# Shells
<u>shrimp</u>							
010828.1btw	Palaemonetes paludosus (freshwater shrimp)			dipnet	1.25h		
<u>snail</u>							
010828.1btw	Campeloma decisum (pointed campeloma)			visual/dipnet	1.25h		
010828.1btw	Helisoma anceps (two-ridge rams-horn)			visual/Dipnet	1.25h		
010828.1btw	Micromenetus dilatatus (bugle sprite)			visual/dipnet	1.25h	1	
010828.1btw	Physella sp. (physa snail)			visual/Dipnet	1.25h		
<u>Little River @ SR 1934</u>							
<u>clam</u>							
011016.3ahf	Corbicula fluminea (Asian clam)	s,sa,d,m		visual	0.93h		
<u>crayfish</u>							
011016.3ahf	Procambarus (Ortmannicus) acutus (White River crayfish)	s,sa,d,m		dipnet	0.93h	2	
<u>fish</u>							
011016.3ahf	Centrarchus macropterus (flier)	s,sa,d,m		dipnet	0.93h	1	
011016.3ahf	Gambusia holbrooki (eastern mosquitofish)	s,sa,d,m		dipnet	0.93h		
011016.3ahf	Lepomis auritus (redbreast sunfish)	s,sa,d,m		dipnet	0.93h		
011016.3ahf	Lepomis macrochirus (bluegill)	s,sa,d,m		dipnet	0.93h	2	
<u>mussel</u>							
011016.3ahf	Elliptio cistelliformis (box spike)	s,sa,d,m		visual	0.93h		
<u>snail</u>							
011016.3ahf	Helisoma anceps (two-ridge rams-horn)	s,sa,d,m		dipnet/visual	0.93h	1	
011016.3ahf	Hydrobiidae (hydrobiid)	s,sa,d,m		dipnet/visual	0.93h	1	
011016.3ahf	Physella sp. (physa snail)	s,sa,d,m		dipnet/visual	0.93h		
<u>Little River @ SR 2130-</u>							
<u>clam</u>							
011105.5btw	Corbicula fluminea (Asian clam)	Sa,c.co,bo,p,g,v,d		visual			
<u>fish</u>							
011105.5btw	Anguilla rostrata (American eel)	Sa,c.co,bo,p,g,v,d		electroshock	508s		
011105.5btw	Emmeacanthus gloriosus (bluespotted sunfish)	Sa,c.co,bo,p,g,v,d		electroshock	508s	1	
011105.5btw	Etheostoma nigrum/olmstedti (johnny/tessellated darter)	Sa,c.co,bo,p,g,v,d		electroshock	508s		
011105.5btw	Hypentelium nigricans (northern hogsucker)	Sa,c.co,bo,p,g,v,d		electroshock	508s		
011105.5btw	Lepomis auritus (redbreast sunfish)	Sa,c.co,bo,p,g,v,d		electroshock	508s		
011105.5btw	Luxilus albeolus (white shiner)	Sa,c.co,bo,p,g,v,d		electroshock	508s		
011105.5btw	Lythrurus matutinus (pinewoods shiner)	Sa,c.co,bo,p,g,v,d		electroshock	508s	4	
011105.5btw	Nocomis leptoccephalus (bluehead chub)	Sa,c.co,bo,p,g,v,d		electroshock	508s		
011105.5btw	Notropis procne(spottail shiner)	Sa,c.co,bo,p,g,v,d		electroshock	508s		



# Location

Site (date) and species	Substrate	Technique	Time	# Live	# Shells
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## fish

011105.5btw	Noturus insignis (marginated madtom)	Sa,c,co,bo,p,g,v,d	electroshock	508s	5
011105.5btw	Percina roanoka (Roanoke darter)	Sa,c,co,bo,p,g,v,d	electroshock	508s	
011105.5btw	Scartomyzon cervinus (black jumprock)	Sa,c,co,bo,p,g,v,d	electroshock	508s	

## Little River @ SR 2320

## clam

010725.1jaj	Corbicula fluminea (Asian clam)	c,s,Sa,G,Co	tactile/visual	0.5h	
010725.2jaj	Corbicula fluminea (Asian clam)	s,sa,B,v,D	tactile/visual	1h	
010725.4jaj	Corbicula fluminea (Asian clam)	c,S,Sa,g,co,bo,r,d	tactile/visual	1.55h	
010725.5jaj	Corbicula fluminea (Asian clam)	S,Sa,g,co,bo	visual	0.58h	
010725.6jaj	Corbicula fluminea (Asian clam)	S,sa,g,co,bo,r,d	tactile/visual	0.77h	

## mussel

010725.1jaj	Elliptio complanata (eastern Elliptio)	c,s,Sa,G,Co	tactile/visual	0.5h	67
010725.2jaj	Elliptio complanata (eastern Elliptio)	s,sa,B,v,D	tactile	1h	3
010725.3jaj	Elliptio complanata (eastern Elliptio)	s,Sa,G,co,bo,v,d	tactile	1.05h	18
010725.4jaj	Elliptio complanata (eastern Elliptio)	c,S,Sa,g,co,bo,r,d	tactile	1.55h	101
010725.5jaj	Elliptio complanata (eastern Elliptio)	S,Sa,g,co,bo	visual	0.58h	3
010725.6jaj	Elliptio complanata (eastern Elliptio)	S,sa,g,co,bo,r,d	tactile	0.77h	18
010725.1jaj	Elliptio icterina (variable spike)	c,s,Sa,G,Co	tactile/visual	0.5h	3
010725.3jaj	Elliptio icterina (variable spike)	s,Sa,G,co,bo,v,d	tactile	1.05h	1
010725.4jaj	Elliptio icterina (variable spike)	c,S,Sa,g,co,bo,r,d	tactile	1.55h	4
010725.1jaj	Elliptio viridula (green lance)	c,s,Sa,G,Co	tactile/visual	0.5h	1
010725.4jaj	Elliptio viridula (green lance)	c,S,Sa,g,co,bo,r,d	tactile/visual	1.55h	5
010725.1jaj	lanceolate Elliptio (lance)	c,s,Sa,G,Co	tactile/visual	0.5h	2

## snail

010725.1jaj	Campeloma decusum (pointed campeloma)	c,s,Sa,G,Co	tactile/visual	0.5h	
010725.2jaj	Campeloma decusum (pointed campeloma)	s,sa,B,v,D	tactile	1h	
010725.4jaj	Campeloma decusum (pointed campeloma)	c,S,Sa,g,co,bo,r,d	tactile/visual	1.55h	
010725.5jaj	Campeloma decusum (pointed campeloma)	S,Sa,g,co,bo	visual	0.58h	
010725.6jaj	Campeloma decusum (pointed campeloma)	S,sa,g,co,bo,r,d	tactile	0.77h	
010725.1jaj	Elimia catenaria (gravel elimia)	c,s,Sa,G,Co	tactile/visual	0.5h	

## Little River @ SR 2320+

## crayfish

010828.2btw	Cambarus (Puncicambarus) sp. C (n/a)	dipnet/electroshock/vis.	2h/1065s		
010828.2btw	Procamburus (Ortmannicus) acutus (White River crayfish)	dipnet/electroshock/vis.	2h/1065s	1	

# Location

Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
<u>fish</u>					
010828.2btw Ameiurus platycephalus (flat bullhead)		electroshock	1065s		
010828.2btw Anguilla rostrata (American eel)		electroshock	1065s		
010828.2btw Etheostoma nigrum/olmstedii (johnny/tessellated darter)		electroshock	1065s		
010828.2btw Gambusia holbrooki (eastern mosquitofish)		electroshock	1065s		
010828.2btw Lepomis auritus (redbreast sunfish)		electroshock	1065s		
010828.2btw Lepomis macrochirus (bluegill)		electroshock	1065s		
010828.2btw Micropterus salmoides (largemouth bass)		electroshock	1065s		
010828.2btw Nocomis leptocephalus (bluehead chub)		electroshock	1065s		
010828.2btw Notropis procer (swallowtail shiner)		electroshock	1065s		
010828.2btw Luxilus albeolus (white shiner)		electroshock	1065s		
010828.2btw Noturus insignis (margined madtom)		electroshock	1065s		
010828.2btw Percina peltata (shield darter)		electroshock	1065s		
010828.2btw Percina roanoka (Roanoke darter)		electroshock	1065s		
010828.2btw Scartomyzon cervinus (black jumprock)		electroshock	1065s		
<u>limpet</u>					
010828.2btw Laevapex fuscus (dusky ancyloid)		dipnet/visual	2h		
<u>shrimp</u>					
010828.2btw Palaemonetes paludosus (freshwater shrimp)		dipnet/electroshock/vis.	2h/1065s		
<u>snail</u>					
010828.2btw Campeloma decisum (pointed campeloma)		dipnet/visual	2h		
010828.2btw Elimia catenaria (gravel elimia)		dipnet/visual	2h		
010828.2btw Helisoma anceps (two-ridge rams-horn)		dipnet/visual	2h		
010828.2btw Hydrobiidae (hydrobiid)		dipnet/visual	2h		
010828.2btw Micromenetus dilatatus (bugle sprite)		dipnet/visual	2h		
Middle Creek @ NC 210					
<u>clam</u>					
011025.1ahf Corbicula fluminea (Asian clam)	Sa,c,p,d	dipnet/visual	1.07h		
011025.1ahf Pisidium dubium (greater eastern peaclam)	Sa,c,p,d	dipnet	1.07h		
<u>crayfish</u>					
011025.1ahf Cambarus (Depressicambarus) latimanus (n/a)	Sa,c,p,d	dipnet	1.07h	4	0
011025.1ahf Orconectes (Procericambarus) carolinensis (NC spiny crayfish)	Sa,c,p,d	dipnet	1.07h	2	0
011025.1ahf Procambarus (Ortmannicus) acutus (White River crayfish)	Sa,c,p,d	dipnet	1.07h	1	0



Location	Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
<i>fish</i>						
	011025.1ahf Enneacanthus gloriosus (bluespotted sunfish)	Sa,c,p,d	dipnet	1.07h	1	
	011025.1ahf Etheostoma nigrum/olmstedii (johnny/tessellated darter)	Sa,c,p,d	dipnet	1.07h	3	
	011025.1ahf Gambusia holbrooki (eastern mosquitofish)	Sa,c,p,d	dipnet	1.07h		
	011025.1ahf Lepomis macrochirus (bluegill)	Sa,c,p,d	dipnet	1.07h	2	
<i>limpet</i>						
	011025.1ahf Laevapex fuscus (dusky ancyloid)	Sa,c,p,d	dipnet/visual	1.07h		
<i>mussel</i>						
	011025.1ahf Elliptio (eastern Elliptio)	Sa,c,p,d	visual	1.07h		
<i>shrimp</i>						
	011025.1ahf Palaemonetes paludosus (freshwater shrimp)	Sa,c,p,d	dipnet	1.07h		
<i>snail</i>						
	011025.1ahf Elimia catenaria (gravel elimia)	Sa,c,p,d	dipnet/visual	1.07h		
	011025.1ahf Helisoma anceps (two-ridge rams-horn)	Sa,c,p,d	dipnet/visual	1.07h		
	011025.1ahf Hydrobiidae (hydrobiid)	Sa,c,p,d	dipnet/visual	1.07h		
	011025.1ahf Physella sp. (physa snail)	Sa,c,p,d	dipnet/visual	1.07h		
<u>Middle Creek @ NC 210+</u>						
<i>clam</i>						
	011102.5btw Corbicula fluminea (Asian clam)		visual			
<i>fish</i>						
	011102.5btw Anguilla rostrata (American eel)		electroshock	184s	2	
	011102.5btw Chaenobryttus gulosus (warmouth)		electroshock	184s	1	
	011102.5btw Lepomis auritus (redbreast sunfish)		electroshock	184s	5	
<u>Middle Creek @ NC 50</u>						
<i>clam</i>						
	011025.4ahf Corbicula fluminea (Asian clam)	s,Sa,p,M	dipnet	1h		
	011025.4ahf Sphaerium striatinum (striated fingernailclam)	s,Sa,p,M	dipnet	1h		
<i>crayfish</i>						
	011025.4ahf Cambarus (Depressicambarus) latimanus (n/a)	s,Sa,p,M	dipnet/visual	1h	1	
	011025.4ahf Orconectes (Procericambarus) carolinensis (NC spiny crayfish)	s,Sa,p,M	dipnet/visual	1h	4	
<i>fish</i>						
	011025.4ahf Enneacanthus gloriosus (bluespotted sunfish)	s,Sa,p,M	dipnet	1h	3	
	011025.4ahf Etheostoma nigrum/olmstedii (johnny/tessellated darter)	s,Sa,p,M	dipnet	1h	5	
<i>limpet</i>						
	011025.4ahf Ferrissia sp. (n/a)	s,Sa,p,M	dipnet	1h		
	011025.4ahf Laevapex fuscus (dusky ancyloid)	s,Sa,p,M	dipnet	1h		

Location	Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
<i>shrimp</i>						
	011025.4ahf Palaemonetes paludosus (freshwater shrimp)	s,Sa,p,M	dipnet	1h		
<i>snail</i>						
	011025.4ahf Helisoma anceps (two-ridge rams-horn)	s,Sa,p,M	dipnet/visual	1h		
	011025.4ahf Micromenetus dilatatus (bugle sprite)	s,Sa,p,M	dipnet/visual	1h		
<u>Middle Creek @ NC 50-</u>						
<i>crayfish</i>						
	011102.1btw Cambarus (Puncticambarus) sp. C (n/a)		electroshock	783s	1	
	011102.1btw Procambanus (Ortmannicus) acutus (White River crayfish)		electroshock	783s	1	
<i>fish</i>						
	011102.1btw Anguilla rostrata (American eel)		electroshock	783s	3	
	011102.1btw Etheostoma nigrum/olmstedii (johnny/tessellated darter)		electroshock	783s		
	011102.1btw Gambusia holbrooki (eastern mosquitofish)		electroshock	783s	1	
	011102.1btw Hypentelium nigricans (northern hogsucker)		electroshock	783s	1	
	011102.1btw Lepomis auritus (redbreast sunfish)		electroshock	783s	2	
	011102.1btw Lepomis macrochirus (bluegill)		electroshock	783s	1	
	011102.1btw Luxilus albeolus (white shiner)		electroshock	783s	1	
	011102.1btw Micropterus salmoides (largemouth bass)		electroshock	783s	1	
	011102.1btw Percina peltata (shield darter)		electroshock	783s	1	
	011102.1btw Percina roanoka (Roanoke darter)		electroshock	783s		
<u>Middle Creek @ SR 1504-/+</u>						
<i>clam</i>						
	011102.4btw Corbicula fluminea (Asian clam)	Sa,c,co,p,g,r,d	visual			
<i>fish</i>						
	011102.4btw Ameiurus platycephalus (flat bullhead)	Sa,c,co,p,g,r,d	electroshock	1146s	1	
	011102.4btw Anguilla rostrata (American eel)	Sa,c,co,p,g,r,d	electroshock	1146s	4	
	011102.4btw Aphredoderus sayanus (pirate perch)	Sa,c,co,p,g,r,d	electroshock	1146s	1	
	011102.4btw Etheostoma nigrum/olmstedii (johnny/tessellated darter)	Sa,c,co,p,g,r,d	electroshock	1146s		
	011102.4btw Hybognathus regius (eastern silvery minnow)	Sa,c,co,p,g,r,d	electroshock	1146s	1	
	011102.4btw Ictalurus punctatus (channel catfish)	Sa,c,co,p,g,r,d	electroshock	1146s	1	
	011102.4btw Lepomis auritus (redbreast sunfish)	Sa,c,co,p,g,r,d	electroshock	1146s		
	011102.4btw Lepomis macrochirus (bluegill)	Sa,c,co,p,g,r,d	electroshock	1146s		
	011102.4btw Luxilus albeolus (white shiner)	Sa,c,co,p,g,r,d	electroshock	1146s	3	
	011102.4btw Moxostoma collapsum (v-lip redhorse)	Sa,c,co,p,g,r,d	electroshock	1146s	1	
	011102.4btw Nocomis leptocephalus (bluehead chub)	Sa,c,co,p,g,r,d	electroshock	1146s		
	011102.4btw Notropis procerus (swallowtail shiner)	Sa,c,co,p,g,r,d	electroshock	1146s	6	
	011102.4btw Noturus insignis (marginated madtom)	Sa,c,co,p,g,r,d	electroshock	1146s	3	



Location

Site (date) and species

Substrate

Search  
Technique

Time # Live # Shells

*fish*

011102.4btw Percina roanoka (Roanoke darter)  
011102.4btw Scartomyzon cervinus (black jumprock)

Sa,c,co,p,g,r,d  
Sa,c,co,p,g,r,d

electroshock  
electroshock

1146s  
1146s

1

Middle Creek @ SR 1507

*clam*

011025.2ahf Musculium partumeium (swamp fingernailclam)  
011025.2ahf Pisidium casertanum (ubiquitous peaclam)

s,sa,c,d,m  
s,sa,c,d,m

dipnet  
dipnet

1

*crayfish*

011025.2ahf Procamburus (Ortmannicus) acutus (White River crayfish)

s,sa,c,d,m

dipnet

9

*fish*

011025.2ahf Aphredoderus sayanus (pirate perch)  
011025.2ahf Centrarchus macropterus (flier)  
011025.2ahf Chaenobrytus gulosus (warmouth)  
011025.2ahf Enneacanthus gloriosus (bluespotted sunfish)  
011025.2ahf Esox americanus (redfin pickerel)  
011025.2ahf Etheostoma fusiforme (swamp darter)  
011025.2ahf Gambusia holbrooki (eastern mosquitofish)  
011025.2ahf Lepomis cyanellus (green sunfish)  
011025.2ahf Lepomis macrochirus (bluegill)

s,sa,c,d,m  
s,sa,c,d,m  
s,sa,c,d,m  
s,sa,c,d,m  
s,sa,c,d,m  
s,sa,c,d,m  
s,sa,c,d,m  
s,sa,c,d,m  
s,sa,c,d,m  
s,sa,c,d,m

dipnet  
dipnet  
dipnet  
dipnet  
dipnet  
dipnet  
dipnet  
dipnet  
dipnet  
dipnet

5  
1  
10  
3  
1  
1  
1  
10

*limpet*

011025.2ahf Ferrissia sp. (n/a)

s,sa,c,d,m

dipnet

0.5h

*shrimp*

011025.2ahf Palaemonetes paludosus (freshwater shrimp)

s,sa,c,d,m

dipnet

0.5h

*snail*

011025.2ahf Micromenetus dilatatus (bugle sprite)  
011025.2ahf Physella sp. (physa snail)  
011025.2ahf Pseudosuccinea columella (mimic lymnaea)

s,sa,c,d,m  
s,sa,c,d,m  
s,sa,c,d,m

dipnet  
dipnet  
dipnet

0.5h  
0.5h  
0.5h

Mill Creek @ SR 1124

*clam*

011017.1ahf Pisidium casertanum (ubiquitous peaclam)

d,m

dipnet

0.55h

*crayfish*

011017.1ahf none (n/a)

d,m

dipnet

0.55h

*fish*

011017.1ahf Aphredoderus sayanus (pirate perch)  
011017.1ahf Chologaster comuta (swampfish)

d,m  
d,m

dipnet  
dipnet

0.55h  
0.55h

1  
2

LIBRARY

NC State Museum of Natural Sciences

# Location

Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
<u>fish</u>					
011017.1ahf Elasmoma zonatum (banded pygmy sunfish)	d,m	dipnet	0.55h	1	
011017.1ahf Enneacanthus gloriosus (bluespotted sunfish)	d,m	dipnet	0.55h		
011017.1ahf Etheostoma serrifer (sawcheek darter)	d,m	dipnet	0.55h	3	
011017.1ahf Gambusia holbrooki (eastern mosquitofish)	d,m	dipnet	0.55h		
<u>shrimp</u>					
011017.1ahf Palaemonetes paludosus (freshwater shrimp)	d,m	dipnet	0.55h		
<u>snail</u>					
011017.1ahf Hydrobiidae (hydrobiid)	d,m	dipnet	0.55h		
011017.1ahf Micromenetus dilatatus (bugle sprite)	d,m	dipnet/visual	0.55h	1	
011017.1ahf Physella sp. (physa snail)	d,m	dipnet	0.55h	5	
<u>Mill Creek @ SR 1185</u>					
<u>clam</u>					
011017.3ahf Musculium partumeium (swamp fingernailclam)	s,v,d,m	dipnet	0.93h		
<u>crayfish</u>					
011017.3ahf Procambarus (Ortmannicus) acutus (White River crayfish)	s,v,d,m	dipnet	0.93h	7	
011017.3ahf Procambarus (Ortmannicus) medialis (Tar River/Albemarle)	s,v,d,m	dipnet	0.93h	7	
<u>fish</u>					
011017.3ahf Aphredoderus sayanus (pirate perch)	s,v,d,m	dipnet	0.93h	4	
011017.3ahf Chologaster cornuta (swampfish)	s,v,d,m	dipnet	0.93h		
011017.3ahf Elasmoma zonatum (banded pygmy sunfish)	s,v,d,m	dipnet	0.93h		
011017.3ahf Enneacanthus gloriosus (bluespotted sunfish)	s,v,d,m	dipnet	0.93h		
011017.3ahf Etheostoma serrifer (sawcheek darter)	s,v,d,m	dipnet	0.93h	3	
011017.3ahf Gambusia holbrooki (eastern mosquitofish)	s,v,d,m	dipnet	0.93h		
011017.3ahf Notropis cummingsae (dusky shiner)	s,v,d,m	dipnet	0.93h	1	
<u>limpet</u>					
011017.3ahf Laevapex fuscus (dusky ancyloid)	s,v,d,m	dipnet/visual	0.93h	2	
<u>shrimp</u>					
011017.3ahf Palaemonetes paludosus (freshwater shrimp)	s,v,d,m	dipnet	0.93h		
<u>snail</u>					
011017.3ahf Campeloma decisum (pointed campeloma)	s,v,d,m	dipnet/visual	0.93h		
011017.3ahf Micromenetus dilatatus (bugle sprite)	s,v,d,m	dipnet/visual	0.93h		
011017.3ahf Physella sp. (physa snail)	s,v,d,m	dipnet/visual	0.93h		
011017.3ahf Pseudosuccinea columella (mimic lymnaea)	s,v,d,m	dipnet/visual	0.93h	4	



Location Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
<u>Mill Creek @ SR 1185-</u>					
<u>fish</u>					
011128.4btw Gambusia holbrooki (eastern mosquitofish)		electroshock	265s	1	
011128.4btw Noturus gyrinus (tadpole madtom)		electroshock	265s	1	
<u>shrimp</u>					
011128.4btw Palaemonetes paludosus (freshwater shrimp)		electroshock	265s		
<u>Mill Creek @ SR 1201</u>					
<u>clam</u>					
011016.6ahf Corbicula fluminea (Asian clam)	s,C,d,m	dipnet	1.13h		
011016.6ahf Musculium partuncium (swamp fingernailclam)	s,C,d,m	dipnet	1.13h	1	
<u>crayfish</u>					
011016.6ahf Procambanus (Ortmannicus) acutus (White River crayfish)	s,C,d,m	dipnet/dug	1.13h	1	
<u>fish</u>					
011016.6ahf Chologaster cornuta (swampfish)	s,C,d,m	dipnet	1.13h	4	
011016.6ahf Etheostoma fusiforme (swamp darter)	s,C,d,m	dipnet	1.13h	1	
011016.6ahf Gambusia holbrooki (eastern mosquitofish)	s,C,d,m	dipnet	1.13h		
011016.6ahf Lepomis macrochirus (bluegill)	s,C,d,m	dipnet	1.13h	2	
<u>limpet</u>					
011016.6ahf Laevapex fuscus (dusky ancyloid)	s,C,d,m	dipnet/visual	1.13h		
<u>muscle</u>					
011016.6ahf lanceolate Elliptio (lance)	s,C,d,m	dipnet	1.13h	1	
<u>shrimp</u>					
011016.6ahf Palaemonetes paludosus (freshwater shrimp)	s,C,d,m	dipnet	1.13h		
<u>snail</u>					
011016.6ahf Campeloma decisum (pointed campeloma)	s,C,d,m	dipnet	1.13h	15	
011016.6ahf Hydrobiidae (hydrobiid)	s,C,d,m	dipnet	1.13h		
<u>Polecat Branch @ SR 1007</u>					
<u>clam</u>					
011016.4ahf Musculium sp.(partuncium?) (n/a)	s,v,d,M	dipnet	1h	4	
<u>crayfish</u>					
011016.4ahf Procambanus (Ortmannicus) acutus (White River crayfish)	s,v,d,M	dipnet	1h	1	
<u>fish</u>					
011016.4ahf Enneacanthus gloriosus (bluespotted sunfish)	s,v,d,M	dipnet	1h	2	
011016.4ahf Gambusia holbrooki (eastern mosquitofish)	s,v,d,M	dipnet	1h		

Location	Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
<i>fish</i>						
	011016.4ahf Umbra pygmaea (eastern mudminnow)	s, v, d, M	dipnet	1h		
<i>shrimp</i>						
	011016.4ahf Palaemonetes paludosus (freshwater shrimp)	s, v, d, M	dipnet	1h		
<i>snail</i>						
	011016.4ahf Pseudosuccinea columella (mimic lymnaea)	s, v, d, M	dipnet/visual	1h	2	1
<u>Polecat Branch @ SR 1007-</u>						
<i>fish</i>						
	011128.6btw Enneacanthus gloriosus (bluespotted sunfish)		electroshock	195s		
	011128.6btw Gambusia holbrooki (eastern mosquitofish)		electroshock	195s		
<i>shrimp</i>						
	011128.6btw Palaemonetes paludosus (freshwater shrimp)		electroshock	195s		
<u>Stone Creek @ SR 1138</u>						
<i>clam</i>						
	011017.2ahf Musculium sp. (n/a)	s, sa, v, d, m	dipnet	1h	1	
<i>crayfish</i>						
	011017.2ahf Procamburus (Ortmannicus) acutus (White River crayfish)	s, sa, v, d, m	dipnet	1h		
<i>fish</i>						
	011017.2ahf Aphredoderus sayanus (pirate perch)	s, sa, v, d, m	dipnet	1h		
	011017.2ahf Elasmoma zonatum (banded pygmy sunfish)	s, sa, v, d, m	dipnet	1h		
	011017.2ahf Enneacanthus gloriosus (bluespotted sunfish)	s, sa, v, d, m	dipnet	1h		
	011017.2ahf Etheostoma serifer (sawtooth darter)	s, sa, v, d, m	dipnet	1h	1	
	011017.2ahf Gambusia holbrooki (eastern mosquitofish)	s, sa, v, d, m	dipnet	1h		
<i>shrimp</i>						
	011017.2ahf Palaemonetes paludosus (freshwater shrimp)	s, sa, v, d, m	dipnet	1h	45	
<i>snail</i>						
	011017.2ahf Physella sp. (physa snail)	s, sa, v, d, m	dipnet/visual	1h		
	011017.2ahf Pseudosuccinea columella (mimic lymnaea)	s, sa, v, d, m	dipnet/visual	1h	3	
<u>Stone Creek @ SR 1138-</u>						
<i>crayfish</i>						
	011128.3btw Procamburus (Ortmannicus) acutus (White River crayfish)		electroshock	262s		
<i>fish</i>						
	011128.3btw Aphredoderus sayanus (pirate perch)		electroshock	262s	1	
	011128.3btw Centrarchus macropterus (flier)		electroshock	262s	1	
	011128.3btw Enneacanthus gloriosus (bluespotted sunfish)		electroshock	262s	1	

Location	Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
<u>fish</u>						
	011128.3btw Erinyzon oblongus (creek chubsucker)		electroshock	262s		
	011128.3btw Esox americanus (redfin pickerel)		electroshock	262s	2	
	011128.3btw Gambusia holbrooki (eastern mosquitofish)		electroshock	262s		
<u>shrimp</u>						
	011128.3btw Palaemonetes paludosus (freshwater shrimp)		electroshock	262s		
Swift Creek @ NC 210-						
<u>clam</u>						
	010802.2btw Corbicula fluminea (Asian clam)	Sa, c, d	snorkel	3.5h		
<u>crayfish</u>						
	010802.2btw none (n/a)	Sa, c, d		3.5h		
<u>fish</u>						
	010802.2btw Ameiurus catus (white catfish)	Sa, c, d	snorkel	3.5h		
	010802.2btw Cyprinella analostana (satinfin shiner)	Sa, c, d	snorkel	3.5h		
	010802.2btw Etheostoma nigrum/olmsted (johnny/tessellated darter)	Sa, c, d	snorkel	3.5h		
	010802.2btw Gambusia holbrooki (eastern mosquitofish)	Sa, c, d	snorkel	3.5h		
	010802.2btw Lythrurus matutinus (pinewoods shiner)	Sa, c, d	snorkel	3.5h		
	010802.2btw Percina peltata (shield darter)	Sa, c, d	snorkel	3.5h		
<u>mussel</u>						
	010802.2btw Elliptio complanata (eastern Elliptio)	Sa, c, d	snorkel	3.5h	13	5
	010802.2btw Elliptio congracea (Carolina slabshell)	Sa, c, d	snorkel	3.5h	1	
	010802.2btw Elliptio icterina (variable spike)	Sa, c, d	snorkel	3.5h	1	
	010802.2btw Elliptio lanceolata (yellow lance)	Sa, c, d	snorkel	3.5h	1	
<u>snail</u>						
	010802.2btw none (n/a)	Sa, c, d		3.5h		
Swift Creek @ SR 1501-						
<u>clam</u>						
	011128.7btw Corbicula fluminea (Asian clam)	Sa, c, r, d	visual			
<u>crayfish</u>						
	011128.7btw none (n/a)	Sa, c, r, d				
<u>fish</u>						
	011128.7btw Anguilla rostrata (American eel)	Sa, c, r, d	electroshock	656s		
	011128.7btw Cyprinella analostana (satinfin shiner)	Sa, c, r, d	electroshock	656s	2	
	011128.7btw Etheostoma nigrum/olmsted (johnny/tessellated darter)	Sa, c, r, d	electroshock	656s		
	011128.7btw Hybognathus regius (eastern silvery minnow)	Sa, c, r, d	electroshock	656s	1	
	011128.7btw Hypentelium nigricans (northern hogsucker)	Sa, c, r, d	electroshock	656s	1	



Location		Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
		<i>fish</i>					
		011128.7btw Ictalurus punctatus (channel catfish)	Sa, c, r, d	electroshock	656s	1	
		011128.7btw Lepomis auritus (redbreast sunfish)	Sa, c, r, d	electroshock	656s		
		011128.7btw Lepomis macrochirus (bluegill)	Sa, c, r, d	electroshock	656s		
		011108.7btw Lythrurus matutinus (pinewoods shiner)	Sa, c, r, d	electroshock	656s		
		011128.7btw Nocomis leptocephalus (bluehead chub)	Sa, c, r, d	electroshock	656s		
		011128.7btw Luxilus albeolus (white shiner)	Sa, c, r, d	electroshock	656s		
		011128.7btw Percina roanoka (Roanoke darter)	Sa, c, r, d	electroshock	656s		
		011128.7btw Pylodictis olivaris (flathead catfish)	Sa, c, r, d	electroshock	656s	1	
		<i>mussel</i>					
		011128.7btw Elliptio complanata (eastern Elliptio)	Sa, c, r, d	visual			2

Swift Creek @ SR 1525-

## clam

011025.5ahf *Corticula fluminea* (Asian clam)

## crayfish

011025.Sahf	<i>Procambanus (Otmannicus) acutus</i> (White River crayfish)	s.s.a.d.M	1h	12
			dinner	

Case no.	Age	Sex	Occupation	Presenting complaint	Investigation	Diagnosis	Management	Outcome
011025	25	Male	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

## fish

011025.5ahf Chaenobryttus gulosus (warmouth)

011025.5ahf *Enneacanthus gloriösus* (bluespotted sunfish)  
s.s.a.d.M  
dinner  
1h  
3

011025.5a	Etheostoma nigrum/olmstedii (johnny/tesseled tarter)	s.s.a.d.M	1h	5
			dinner	

011025.5ahf *Gambusia holbrooki* (eastern mosquitofish)  
s.sa.d.M

## shrimp

011025.5ahf Palaemonetes paludosus (freshwater shrimp)  
s.s.a.d.M  
dinner  
1h

snail

011025.5ahf Hydrobiidae (hydrobiid)

011025.5ahf Micromeretus dilatatus (bugle sprite)

011025.5ahf Physella sp. (physa snail)

Swift Creek @ SR 1555 to SR 1643

*nussel*

10921.11aj Alasmidonia undulata (triangle floater)

10921.3jaj Alasmidonta undulata (triangle floater)

10921.4ja	Alasmidontia undulata (triangle floater)	view
		view

110921.11aj Elliptio roanokensis (Roanoke slabsell)

10921.2:jaj Elliptio roanokensis (Roanoke slabshell)  
c.s.Sa.G  
visual  
0.67h  
ZII  
31

10921.1aj Elliptio spp. (n/a)	view	0.0/11	Z
	view	06	107
	view	06	107

Location	Site (date) and species	Substrate	Search Technique	Time	# Live	# Shells
<u>mussel</u>						
	010921.2jaj Elliptio spp. (n/a)	c,s,Sa,G	visual	0.67h	23	
	010921.3jaj Elliptio spp. (n/a)	s,s,a,Co,g	visual			
<u>snail</u>						
	010921.2jaj Campeloma decisum (pointed campeloma)	c,s,Sa,G	visual	0.67h		
	010921.3jaj Elimia catenaria (gravel elimia)	s,s,a,Co,g	visual			
<u>Swift Creek @ SR 1562-</u>						
<u>fish</u>						
	011105.1btw Ameiurus platycephalus (flat bullhead)		electroshock	532s	1	
	011105.1btw Anguilla rostrata (American eel)		electroshock	532s	1	
	011105.1btw Chaenobryttus gulosus (warmouth)		electroshock	532s	3	
	011105.1btw Cyprinella analostana (satinfin shiner)		electroshock	532s		
	011105.1btw Etheostoma nigrum/olmstedii (johnny/tesselated darter)		electroshock	532s		
	011105.1btw Gambusia holbrooki (eastern mosquitofish)		electroshock	532s		
	011105.1btw Lepomis auritus (redbreast sunfish)		electroshock	532s		
	011105.1btw Lepomis macrochirus (bluegill)		electroshock	532s		
	011105.1btw Notropis procer (swallowtail shiner)		electroshock	532s		
	011105.1btw Percina roanoka (Roanoke darter)		electroshock	532s		
<u>mussel</u>						
	011105.1btw Corbicula fluminea (Asian clam)		visual			
<u>Swift Creek @ SR 1562-/+</u>						
<u>clam</u>						
	011105.2btw Corbicula fluminea (Asian clam)	Sa,co,p,g,d	visual			
<u>crayfish</u>						
	011105.2btw Cambarus (Puncticambarus) sp. C (n/a)	Sa,co,p,g,d	electroshock	940s	1	
<u>fish</u>						
	011105.2btw Ameiurus platycephalus (flat bullhead)	Sa,co,p,g,d	electroshock	940s	1	
	011105.2btw Anguilla rostrata (American eel)	Sa,co,p,g,d	electroshock	940s	3	
	011105.2btw Aphredoderus sayanus (pirate perch)	Sa,co,p,g,d	electroshock	940s	1	
	011105.2btw Etheostoma flabellare (fantail darter)	Sa,co,p,g,d	electroshock	940s		
	011105.2btw Etheostoma nigrum/olmstedii (johnny/tesselated darter)	Sa,co,p,g,d	electroshock	940s		
	011105.2btw Hypentelium nigricans (northern hogsucker)	Sa,co,p,g,d	electroshock	940s	1	
	011105.2btw Lepomis auritus (redbreast sunfish)	Sa,co,p,g,d	electroshock	940s		
	011105.2btw Lepomis macrochirus (bluegill)	Sa,co,p,g,d	electroshock	940s	3	
	011105.2btw Luxilus albeolus (white shiner)	Sa,co,p,g,d	electroshock	940s	3	

# Location

Site (date) and species	Substrate	Technique	Time	# Live	# Shells
<i>fish</i>					
011105.2btw Moxostoma collapsum (v-lip redhorse)	Sa,co,p,g,d	electroshock	940s	1	
011105.2btw Nocomis leptoccephalus (bluehead chub)	Sa,co,p,g,d	electroshock	940s		
011105.2btw Noturus insignis (marginated madlom)	Sa,co,p,g,d	electroshock	940s	4	
011105.2btw Percina peltata (shield darter)	Sa,co,p,g,d	electroshock	940s	1	
011105.2btw Percina roanoka (Roanoke darter)	Sa,co,p,g,d	electroshock	940s		
011105.2btw Scartomyzon cervinus (black jumprock)	Sa,co,p,g,d	electroshock	940s	3	
<i>mussel</i>					
011105.2btw Elliptio complanata (eastern Elliptio)	Sa,co,p,g,d	visual			1



**Table 3.** Historical records of aquatic species found in Johnston County during previous aquatic inventories conducted by NC Wildlife Resources Commission staff and colleagues. Records where "none" was recorded indicate that no animals were observed during the search period, but does not necessarily mean that animals do not occur at the site. Also note that all taxa were not necessarily surveyed at each site (surveys were conducted primarily for freshwater mussels). Substrates, where given, are defined as follows, with dominant substrates capitalized: b=bedrock, b=boulder, c=clay, co=cobble, d=detritus, g=gravel, m=mud, p=pebble, r=roots, s=silt, sa=sand, v=vegetation.

Location		Search		
Site (date) and species	Substrate	Technique	Time	# Live # Shells
<u>Bernal Branch @ SR 1229</u>				
<i>muschel</i>				0
000707.3tws none (n/a)				
<u>Black Creek @ SR 1330+</u>				
<i>muschel</i>				
910515.1jma Elliptio complanata (eastern Elliptio)			0.5h	
910515.1jma Elliptio icterina (variable spike)			0.5h	
<u>Buffalo Creek @ NC 96</u>				
<i>clam</i>				
980604.1jaj Corbicula fluminea (Asian clam)	c,s,Sa,G,co,bo	tactile	1h	
<i>muschel</i>				
980604.1jaj none (n/a)	c,s,Sa,G,co,bo	tactile	1h	
<u>Buffalo Creek @ SR 1941-</u>				
<i>muschel</i>				
980618.1jaj Elliptio spp. (n/a)	C,S,sa,G	tactile	1h	60
<u>Buffalo Creek @ SR 2129</u>				
<i>muschel</i>				
980603.6jaj Elliptio spp. (n/a)	r,c,s,Sa	tactile	0.27h	8
980603.7jaj Elliptio spp. (n/a)	r,C,s,Sa,G,b	tactile	2h	348
980603.6jaj lanceolate Elliptio (lance)	r,c,s,Sa	tactile	0.27h	1
980603.7jaj lanceolate Elliptio (lance)	r,C,s,Sa,G,b	tactile	2h	6
<u>Buffalo Creek @ SR 2130</u>				
<i>clam</i>				
980603.5jaj Corbicula fluminea (Asian clam)	r,C,S,sa,g		4h	
<i>muschel</i>				
980603.5jaj Alasmidonta heterodon (dwarf wedgemussel)	r,C,S,sa,g	tactile	4h	1
980603.5jaj Elliptio spp. (n/a)	r,C,S,sa,g	tactile	4h	415

Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<i>mussel</i>	980603.5jaj lanceolate Elliptio (lance)	r,C,S,sa,g	tactile	4h	8	1
<i>snail</i>						
980603.5jaj	Campeloma sp. (n/a)	r,C,S,sa,g		4h		
980603.5jaj	Planorbidae (n/a)	r,C,S,sa,g		4h		
<u>Buffalo Creek @ SR 2130-</u>						
<i>mussel</i>	980618.2jaj Elliptio spp. (n/a)	s,sa,g	visual	1.33h	227	
	980618.2jaj lanceolate Elliptio (lance)	s,sa,g	visual	1.33h	5	
<u>Buffalo Creek @ SR 2130+</u>						
<i>mussel</i>	980825.1jaj Alasmidonta undulata (triangle floater)		visual			1
	980825.1jaj Elliptio spp. (n/a)		visual			
	980825.1jaj lanceolate Elliptio (lance)		visual		5	
<u>Cattail Creek @ NC 96+</u>						
<i>mussel</i>	980518.2jaj none (n/a)	c,s,Sa,G,co		1.25h		
<u>Cattail Creek @ SR 1700-</u>						
<i>mussel</i>	980518.3jaj Elliptio spp. (n/a)	r,c,S,Sa,g	tactile	2.75h	6	
	980518.3jaj lanceolate Elliptio (lance)	r,c,S,Sa,g	tactile	2.75h	1	
<i>snail</i>						
	980518.3jaj Campeloma sp. (n/a)	r,c,S,Sa,g		2.75h		
	980518.3jaj Helisoma anceps (two-ridge rams-horn)	r,c,S,Sa,g		2.75h		
<u>Copper Branch @ SR 1563</u>						
<i>mussel</i>	960523.3jma Elliptio spp. (n/a)			0.7h	4	
<u>Ditch near E Buffalo Creek @ NC 42</u>						
<i>crayfish</i>						
	920403.2cmg Procambarus (Ortmannicus) medialis (Tar River/Albemarle					
<u>Hannah Creek @ NC 96</u>						
<i>mussel</i>						
	000707.2tws none (n/a)					0

Location	Site (date) and species	Substrate	Technique	Time	# Live	# Shells
Hannah Creek @ SR 1009-/+	<u>mussel</u>					
	910828.2jma Elliptio spp. (n/a)			1.5h		
Hannah Creek @ SR 1171	<u>mussel</u>					
	980820.1tws none (n/a)		snorkel	0.5h	0	
Juniper Swamp/Juniper Swamp Trib @ I-95	<u>mussel</u>					
	940525.2tws none (n/a)			0.5h	0	
Little Creek @ SR 1001	<u>crayfish</u>					
	980603.4jaj Procambarus sp. (n/a)	c,S,sa,g	visual	0.33h		
	<u>mussel</u>					
Little Creek @ SR 1562	980603.4jaj none (n/a)	c,S,sa,g	tactile	0.33h		
Little Creek @ SR 2141	<u>clam</u>					
	940525.4tws Corbicula fluminea (Asian clam)	g		0.5h		
	<u>mussel</u>					
Little Creek @ SR 2141	940525.4tws Elliptio spp. (n/a)	g		0.5h	21	
Little River @ n/a	<u>mussel</u>					
	980603.3jaj none (n/a)	s,Sa,G	tactile	0.67h		
Little River @ n/a	<u>clam</u>					
	830712.2024ahc Corbicula fluminea (Asian clam)	s,sa,det	visual	1.3h	4	
	<u>mussel</u>					
Little River @ n/a	830712.2024ahc Elliptio complanata (eastern Elliptio)	s,sa,det	visual	1.3h	14	7
	830712.2024ahc Elliptio steinstansana (Tar spiny mussel)	s,sa,det	visual	1.3h	1	
Little River @ n/a	<u>snail</u>					
	830712.2024ahc Campeloma decisum (pointed campeloma)	s,sa,det	visual	1.3h	2	
	830712.2024ahc Lioplax subcarinata (ridged lioplax)	s,sa,det	visual	1.3h	1	



Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<u>Little River Trib @ SR 1723</u>						
<u>mussel</u>						
	980520.5jaj Elliptio spp. (n/a)	c,s,Sa,g	tactile	0.25h	8	
<u>Little River @ NC 231</u>						
<u>mussel</u>						
	961015.1tws Elliptio spp. (n/a)	n/a	snorkel	1h	18	
<u>Little River @ NC 231-</u>						
<u>mussel</u>						
	980709.1jaj Alasmidonta undulata (triangle floater)	c,S,Sa,g	tactile	3.35h	3	
	980709.1jaj Elliptio spp. (n/a)	c,S,Sa,g	tactile	3.35h	252	
<u>Little River @ NC 231+</u>						
<u>clam</u>						
	980714.2jaj Corbicula fluminea (Asian clam)	C,s,Sa,g		2h		
	980714.3jaj Corbicula fluminea (Asian clam)	w,c,S,sa,bo,b		2.25h		
<u>mussel</u>						
	980714.3jaj Alasmidonta undulata (triangle floater)	w,c,S,sa,bo,b	tactile	2.25h	3	
	980714.2jaj Elliptio spp. (n/a)	C,s,Sa,g	tactile	2h	274	
	980714.3jaj Elliptio spp. (n/a)	w,c,S,sa,bo,b	tactile	2.25h	794	
	980714.2jaj lanceolate Elliptio (lance)	C,s,Sa,g	tactile	2h	1	
	980714.3jaj lanceolate Elliptio (lance)	w,c,S,sa,bo,b	tactile	2.25h	5	
<u>snail</u>						
	980714.2jaj Campeloma sp. (n/a)	C,s,Sa,g		2h		
	980714.3jaj Campeloma sp. (n/a)	w,c,S,sa,bo,b		2.25h		
<u>Little River @ NC 39 to NC 42</u>						
<u>clam</u>						
	980710.2jaj Corbicula fluminea (Asian clam)	r,C,s,sa		1.5h		
<u>mussel</u>						
	980710.3jaj Alasmidonta undulata (triangle floater)	C,s,sa	tactile		1	
	980710.2jaj Elliptio spp. (n/a)	r,C,s,sa	tactile	1.5h	617	
	980710.3jaj Elliptio spp. (n/a)	C,s,sa	tactile		3	
	980710.2jaj lanceolate Elliptio (lance)	r,C,s,sa	tactile	1.5h	7	
	980710.3jaj lanceolate Elliptio (lance)	C,s,sa	tactile		25	
	980710.3jaj Pyganodon cataracta (eastern floater)	C,s,sa	tactile		1	

Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<u>snail</u>						
	980710.2jaj Campeloma sp. (n/a)	r,C,s,sa		1.5h		
<u>Little River @ NC 39/SR 2123</u>						
<u>mussel</u>						
	890724.1jma Alasmidonta undulata (triangle floater)			0.7h	4	
	890724.1jma Elliptio complanata (eastern Elliptio)			0.7h	118	
	890724.1jma Elliptio icterina (variable spike)			0.7h		
	890724.1jma Fusconaia masoni (Atlantic pigtoe)			0.7h		3
	890724.1jma Strophitus undulatus (creeper)			0.7h	4	
<u>Little River @ NC 39+</u>						
<u>mussel</u>						
	980720.5jaj Alasmidonta undulata (triangle floater)	w,c,S,b	tactile	2h	2	
	980720.4jaj Elliptio spp. (n/a)	w,c,s	tactile	1.67h	338	
	980720.5jaj Elliptio spp. (n/a)	w,c,S,b	tactile	2h	1005	
	980720.4jaj lanceolate Elliptio (lance)	w,c,s	tactile	1.67h	10	
	980720.5jaj lanceolate Elliptio (lance)	w,c,S,b	tactile	2h	7	
	980720.3jaj none (n/a)					
	980720.5jaj Villosa constricta (notched rainbow)	w,c,S,b	tactile	2h	1	
<u>Little River @ NC 42</u>						
<u>mussel</u>						
	890908.2jma Alasmidonta heterodon (dwarf wedgemussel)			1h		1
	890908.2jma Alasmidonta undulata (triangle floater)			1h	1	
	890908.2jma Elliptio spp. (n/a)			1h	100	
	970623.2jaj Elliptio spp. (n/a)			0.5h	137	
	890908.2jma Lampsilis cariosa (yellow lampmussel)	S,Sa,G,bo	tactile	1h	1	
	890908.2jma lanceolate Elliptio (lance)			1h		
	970623.2jaj lanceolate Elliptio (lance)			1h		
	890908.2jma Pyganodon cataracta (eastern floater)	S,Sa,G,bo	tactile	0.5h	1	
	970623.2jaj Pyganodon cataracta (eastern floater)			1h		
	890908.2jaj Strophitus undulatus (creeper)			0.5h	1	
	890908.2jma Utterbackia imbecillis (paper pondshell)			1h		
	890908.2jma Villosa constricta (notched rainbow)			1h	1	
	970623.2jaj Villosa constricta (notched rainbow)	S,Sa,G,bo	tactile	0.5h	1	

Location	Site (date) and species	Substrate	Technique	Time	# Live	# Shells
<u>Little River @ NC 42-</u>						
<u>muschel</u>						
	900925.2jma Elliptio complanata (eastern Elliptio)			1h		
	900925.2jma Elliptio icterina (variable spike)			1h		
	900925.2jma Fusconaia masoni (Atlantic pigtoe)			1h	1	
	900925.2jma lanceolate Elliptio (lance)			1h	10	
	900925.2jma Pyganodon cataracta (eastern floater)			1h	5	
	900925.2jma Strophitus undulatus (creeper)			1h	10	
	900925.2jma Uterbackia imbecillis (paper pondshell)			1h	1	
<u>Little River @ NC 96-</u>						
<u>muschel</u>						
	980708.4jaj Elliptio spp. (n/a)	C,s,Sa,g,Co,bo,b	tactile	2.33h	597	
	980708.4jaj lanceolate Elliptio (lance)	C,s,Sa,g,Co,bo,b	tactile	2.33h	16	
	980708.4jaj Villosa constricta (notched rainbow)	C,s,Sa,g,Co,bo,b	tactile	2.33h		1
<u>Little River @ NC 96+</u>						
<u>muschel</u>						
	980708.2jaj Alasmidonta heterodon (dwarf wedgemussel)	R,C,s,Sa	tactile	1.5h	1	
	980708.2jaj Elliptio spp. (n/a)	R,C,s,Sa	tactile	1.5h	98	
	980708.2jaj lanceolate Elliptio (lance)	R,C,s,Sa	tactile	1.5h	13	
<u>Little River @ SR 1001</u>						
<u>clam</u>						
	980810.1jaj Corbicula fluminea (Asian clam)	w,S,co,B		0.33h		
<u>muschel</u>						
	980810.1jaj Elliptio spp. (n/a)	w,S,co,B	tactile	0.33h	4	
	980810.2jaj Elliptio spp. (n/a)	s,sa,co	tactile	0.75h	94	
	980810.3jaj Elliptio spp. (n/a)	r,w,c,s,sa	tactile	1h	117	
	980810.4jaj Elliptio spp. (n/a)	r,w,C,s,sa,co	tactile	1.33h	143	
	980810.2jaj lanceolate Elliptio (lance)	s,sa,co	tactile	0.75h	1	
	980810.3jaj lanceolate Elliptio (lance)	r,w,c,s,sa	tactile	1h	4	
	980810.4jaj lanceolate Elliptio (lance)	r,w,C,s,sa,co	tactile	1.33h	1	1
	980810.4jaj Strophitus undulatus (creeper)	r,w,C,s,sa,co	tactile	1.33h		1
<u>snail</u>						
	980810.1jaj Campeloma sp. (n/a)	w,S,co,B		0.33h		



Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<u>Little River @ SR 1002 to SR 2557</u>						
<i>clam</i>						
	980804.4jaj Corbicula fluminea (Asian clam)	S,Sa,g	visual			
<i>mussel</i>						
	980804.4jaj Elliptio spp. (n/a)	S,Sa,g	visual		1	
	980804.4jaj Pyganodon cataracta (eastern floater)	S,Sa,g	visual		1	1
	980804.4jaj Utterbackia imbecillis (paper pondshell)	S,Sa,g	visual			1
<u>Little River @ SR 1722-</u>						
<i>clam</i>						
	980707.2jaj Corbicula fluminea (Asian clam)	C,S,Sa,bo		1.75h		
<i>mussel</i>						
	980707.2jaj Elliptio spp. (n/a)	C,S,Sa,bo	tactile	1.75h	251	
	980707.2jaj Fusconaia masoni (Atlantic pigtoe)	C,S,Sa,bo	tactile	1.75h	1	
	980707.2jaj lanceolate Elliptio (lance)	C,S,Sa,bo	tactile	1.75h	8	
<i>snail</i>						
	980707.2jaj Campeloma sp. (n/a)	C,S,Sa,bo		1.75h		
<u>Little River @ SR 1722 -</u>						
<i>mussel</i>						
	950921.3jma Elliptio spp. (n/a)			1h	68	
<u>Little River @ SR 1722+</u>						
<i>clam</i>						
	980707.4jaj Corbicula fluminea (Asian clam)	c,s,Sa		1.5h		
<i>mussel</i>						
	980707.4jaj Elliptio spp. (n/a)	c,s,Sa	tactile	1.5h	91	
	980707.4jaj lanceolate Elliptio (lance)	c,s,Sa	tactile	1.5h	11	
<i>snail</i>						
	980707.4jaj Campeloma sp. (n/a)	c,s,Sa		1.5h		
<u>Little River @ SR 1733-</u>						
<i>clam</i>						
	980715.3jaj Corbicula fluminea (Asian clam)	w,C,s,g		0.5h		
<i>mussel</i>						
	980715.2jaj Elliptio spp. (n/a)	w,C,S,g,Co	tactile	1h	96	
	980715.3jaj Elliptio spp. (n/a)	w,C,s,g	tactile	0.5h	18	

Location	Site (date) and species	Substrate	Technique	Time	# Live	# Shells
<u>mussel</u>	980715.2jaj lanceolate Elliptio (lance)	w,C,S,g,Co	tactile	1h	1	
	980715.3jaj lanceolate Elliptio (lance)	w,C,s,g	tactile	0.5h	1	
<u>snail</u>	980715.2jaj Campeloma sp. (n/a)	w,C,S,g,Co		1h		
	980715.3jaj Campeloma sp. (n/a)	w,C,s,g		0.5h		
<u>Little River @ SR 1733+</u>						
<u>mussel</u>	980709.3jaj Elliptio spp. (n/a)	r,C,s,sa,Co	tactile	1h	31	
<u>Little River @ SR 1934-</u>						
<u>clam</u>	980729.3jaj Corbicula fluminea (Asian clam)	r,C,s		1.5h		
<u>mussel</u>	980729.3jaj Alasmidonta undulata (triangle floater)	r,C,s	tactile	1.5h	1	
	980729.3jaj Elliptio spp. (n/a)	r,C,s	tactile	1.5h	109	
	980729.3jaj lanceolate Elliptio (lance)	r,C,s	tactile	1.5h	3	
	980729.2jaj Strophitus undulatus (creeper)	r,Sa,g,co,b	visual		1	
	980729.3jaj Strophitus undulatus (creeper)	r,C,s	tactile	1.5h	1	
	980729.3jaj Villosa constricta (notched rainbow)	r,C,s	tactile	1.5h	1	
<u>snail</u>	980729.3jaj Campeloma sp. (n/a)	r,C,s		1.5h		
<u>Little River @ SR 1934+</u>						
<u>clam</u>	980730.1jaj Corbicula fluminea (Asian clam)	c,S,Co		1.5h		
	980730.2jaj Corbicula fluminea (Asian clam)	c,s,sa,g		0.75h		
<u>mussel</u>	980730.1jaj Alasmidonta undulata (triangle floater)	c,S,Co	tactile	1.5h	2	
	980730.1jaj Elliptio spp. (n/a)	c,S,Co	tactile	1.5h	353	
	980730.2jaj Elliptio spp. (n/a)	c,s,sa,g	tactile	0.75h	157	
	980730.1jaj lanceolate Elliptio (lance)	c,S,Co	tactile	1.5h	12	
	980730.2jaj lanceolate Elliptio (lance)	c,s,sa,g	tactile	0.75h	3	
	980730.1jaj Strophitus undulatus (creeper)	c,S,Co	tactile	1.5h	1	
<u>snail</u>	980730.1jaj Campeloma sp. (n/a)	c,S,Co		1.5h		
	980730.2jaj Campeloma sp. (n/a)	c,s,sa,g		0.75h		

Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<u>Little River @ SR 2123-</u>						
<u>clam</u>						
	980715.5jaj Corbicula fluminea (Asian clam)	R,C,S,sa,g,co		1.75h		
<u>mussel</u>						
	980715.5jaj Elliptio spp. (n/a)	R,C,S,sa,g,co	tactile	1.75h	76	
	980715.6jaj Elliptio spp. (n/a)	r,w,s	tactile	0.75h	101	
	980715.5jaj lanceolate Elliptio (lance)	R,C,S,sa,g,co	tactile	1.75h	4	
	980715.6jaj lanceolate Elliptio (lance)	r,w,s	tactile	0.75h	3	
	980715.5jaj Villosa constricta (notched rainbow)	R,C,S,sa,g,co	tactile	1.75h		2
<u>snail</u>						
	980715.5jaj Campeloma sp. (n/a)	R,C,S,sa,g,co		1.75h		
<u>Little River @ SR 2123+</u>						
<u>clam</u>						
	980720.1jaj Corbicula fluminea (Asian clam)	C,s,sa,g,Co		2.13h		
	980720.2jaj Corbicula fluminea (Asian clam)	C,s,sa,Co		1.67h		
<u>mussel</u>						
	980720.1jaj Elliptio spp. (n/a)	C,s,sa,g,Co	tactile	2.13h	121	
	980720.2jaj Elliptio spp. (n/a)	C,s,sa,Co	tactile	1.67h	102	
	980720.1jaj lanceolate Elliptio (lance)	C,s,sa,g,Co	tactile	2.13h	3	
<u>snail</u>						
	980720.1jaj Campeloma sp. (n/a)	C,s,sa,g,Co		2.13h		
	980720.2jaj Campeloma sp. (n/a)	C,s,sa,Co		1.67h		
	980720.2jaj Elimia catenaria (gravel climia)	C,s,sa,Co		1.67h		
<u>Little River @ SR 2127</u>						
<u>clam</u>						
	980721.3jaj Corbicula fluminea (Asian clam)	S,sa,g,Co		3h		
<u>mussel</u>						
	980721.3jaj Elliptio spp. (n/a)	S,sa,g,Co	tactile	3h	467	
	980721.3jaj lanceolate Elliptio (lance)	S,sa,g,Co	tactile	3h	8	
	980721.3jaj Villosa constricta (notched rainbow)	S,sa,g,Co	tactile	3h	1	
<u>snail</u>						
	980721.3jaj Campeloma sp. (n/a)	S,sa,g,Co		3h		



Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<u>Little River @ SR 2127-</u>						
<u>clam</u>						
	980721.1jaj Corbicula fluminea (Asian clam)	S,g,co				
	980721.2jaj Corbicula fluminea (Asian clam)	r,S		1.33h		
<u>mussel</u>						
	980721.1jaj Elliptio spp. (n/a)	S,g,co	tactile			
	980721.2jaj Elliptio spp. (n/a)	r,S	tactile	1.33h	119	
	980721.2jaj lanceolate Elliptio (lance)	r,S	tactile	1.33h	4	
<u>snail</u>						
	980721.1jaj Campeloma sp. (n/a)	S,g,co				
	980721.2jaj Campeloma sp. (n/a)	r,S		1.33h		
<u>Little River @ SR 2127+</u>						
<u>clam</u>						
	980721.4jaj Corbicula fluminea (Asian clam)	s,Sa,g,co,b				
<u>mussel</u>						
	980721.5jaj Alasmidonta undulata (triangle floater)	r,c,s,sa,B	tactile	2.25h	1	
	980721.6jaj Alasmidonta undulata (triangle floater)	r,c,S,g,Co,b	tactile	2.25h	2	
	980721.4jaj Elliptio spp. (n/a)	s,Sa,g,co,b	visual			
	980721.5jaj Elliptio spp. (n/a)	r,c,s,sa,B	tactile	2.25h	351	
	980721.6jaj Elliptio spp. (n/a)	r,c,S,g,Co,b	tactile	2.25h	475	
	980721.5jaj lanceolate Elliptio (lance)	r,c,s,sa,B	tactile	2.25h	7	
	980721.6jaj lanceolate Elliptio (lance)	r,c,S,g,Co,b	tactile	2.25h	2	
	980721.5jaj Utterbackia imbecillis (paper pondshell)	r,c,s,sa,B	tactile	2.25h	1	
<u>snail</u>						
	980721.4jaj Campeloma sp. (n/a)	s,Sa,g,co,b				
<u>Little River @ SR 2129</u>						
<u>clam</u>						
	980601.2jaj Corbicula fluminea (Asian clam)	C,s,sag		2h		
<u>mussel</u>						
	980601.2jaj Elliptio spp. (n/a)	C,s,sag	tactile	2h	353	
	980601.2jaj lanceolate Elliptio (lance)	C,s,sag	tactile	2h		1
	980601.2jaj Villosa constricta (notched rainbow)	C,s,sag	tactile	2h		1

Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
Little River @ SR 2129+						
<i>clam</i>						
	980728.1jaj Corbicula fluminea (Asian clam)	Sa,g,co,b		1.55h		
	980728.2jaj Corbicula fluminea (Asian clam)	r,w,C,s,sa				
<i>mussel</i>						
	980728.1jaj Elliptio spp. (n/a)	Sa,g,co,b	visual/tactile			
	980728.2jaj Elliptio spp. (n/a)	r,w,C,s,sa	tactile	1.55h	212	
	980728.2jaj lanceolate Elliptio (lance)	r,w,C,s,sa	tactile	1.55h		1
<i>snail</i>						
	980728.2jaj Campeloma sp. (n/a)	r,w,C,s,sa		1.55h		
Little River @ SR 2130-						
<i>clam</i>						
	980722.2jaj Corbicula fluminea (Asian clam)	C,s,sa,g,co		6.75h		
<i>mussel</i>						
	980722.2jaj Alasmidonta undulata (triangle floater)	C,s,sa,g,co	tactile	6.75h		1
	980824.1jaj Alasmidonta undulata (triangle floater)	s,c,sa,g,co,r,det	tactile	6h	3	
	980824.2jaj Alasmidonta undulata (triangle floater)	sa,G	visual/tactile	2.33h	1	
	980722.1jaj Elliptio lanceolata (yellow lance)	r,w,s,Sa,G,co,b	tactile/visual			2
	980722.2jaj Elliptio lanceolata (yellow lance)	C,s,sa,g,co	tactile	6.75h		4
	980824.1jaj Elliptio lanceolata (yellow lance)	s,c,sa,g,co,r,det	tactile	6h	1	
	980824.2jaj Elliptio lanceolata (yellow lance)	sa,G	visual/tactile	2.33h	4	
	980722.1jaj Elliptio spp. (n/a)	r,w,s,Sa,G,co,b	tactile/visual			172
	980722.2jaj Elliptio spp. (n/a)	C,s,sa,g,co	tactile	6.75h	1042	
	980824.1jaj Elliptio spp. (n/a)	s,c,sa,g,co,r,det	tactile	6h	519	
	980824.2jaj Elliptio spp. (n/a)	sa,G	visual/tactile	2.33h	98	
	980825.2jaj Elliptio spp. (n/a)	s,C,sa,g	tactile	0.85h	108	
	980825.3jaj Elliptio spp. (n/a)	S,c,sa,g,co	tactile	1.3h	139	
	980824.2jaj Elliptio steinstansana (Tar spinymussel)	sa,G	visual/tactile	2.33h	1	
	980722.1jaj Fusconaia masoni (Atlantic pigtoe)	r,w,s,Sa,G,co,b	tactile/visual			2
	980722.2jaj Fusconaia masoni (Atlantic pigtoe)	C,s,sa,g,co	tactile	6.75h		3
	980824.1jaj Fusconaia masoni (Atlantic pigtoe)	s,c,sa,g,co,r,det	tactile	6h	1	
	980722.1jaj lanceolate Elliptio (lance)	r,w,s,Sa,G,co,b	tactile/visual			1
	980722.2jaj lanceolate Elliptio (lance)	C,s,sa,g,co	tactile	6.75h	15	
	980824.1jaj lanceolate Elliptio (lance)	s,c,sa,g,co,r,det	tactile	6h	6	
	980824.2jaj lanceolate Elliptio (lance)	sa,G	visual/tactile	2.33h	1	

# Location

## Site (date) and species

## Substrate

## Technique

## Search

## Time # Live # Shells

### mussel

980825.2jaj	lanceolate Elliptio (lance)	s,C,sa,g	tactile	0.85h	6
980825.3jaj	lanceolate Elliptio (lance)	S,c,sa,g,co	tactile	1.3h	4
980722.1jaj	Villosa constricta (notched rainbow)	r,w,s,Sa,G,co,b	tactile/visual		4
980722.2jaj	Villosa constricta (notched rainbow)	C,s,sa,g,co	tactile	6.75h	4
980824.1jaj	Villosa constricta (notched rainbow)	s,c,sa,g,co,r,det	tactile	6h	2
980824.2jaj	Villosa constricta (notched rainbow)	sa,G	visual/tactile	2.33h	3

### snail

980722.2jaj	Campeloma sp. (n/a)	C,s,sa,g,co		6.75h	
980722.2jaj	Elimia catenaria (gravel elimia)	C,s,sa,g,co		6.75h	

## Little River @ SR 2130+

### clam

980728.3jaj	Corbicula fluminea (Asian clam)	w,Sa,co,b		3h	
980728.4jaj	Corbicula fluminea (Asian clam)	c,s,sa,g,Co		2.5h	

### limpet

980728.3jaj	Aneyliidae (limpet)	w,Sa,co,b		3h	
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### mussel

980728.4jaj	Alasmidonta undulata (triangle floater)	c,s,sa,g,Co	tactile	2.5h	1
980728.3jaj	Elliptio spp. (n/a)	w,Sa,co,b	tactile	3h	304
980728.4jaj	Elliptio spp. (n/a)	c,s,sa,g,Co	tactile	2.5h	78
980728.3jaj	lanceolate Elliptio (lance)	w,Sa,co,b	tactile	3h	4
980728.4jaj	lanceolate Elliptio (lance)	c,s,sa,g,Co	tactile	2.5h	6
980728.3jaj	Villosa constricta (notched rainbow)	w,Sa,co,b	tactile	3h	1
980728.4jaj	Villosa constricta (notched rainbow)	c,s,sa,g,Co	tactile	2.5h	2

### snail

980728.3jaj	Campeloma sp. (n/a)	w,Sa,co,b		3h	
980728.4jaj	Campeloma sp. (n/a)	c,s,sa,g,Co		2.5h	
980728.4jaj	Elimia catenaria (gravel elimia)	c,s,sa,g,Co		2.5h	
980728.3jaj	Hydrobiidae (n/a)	w,Sa,co,b		3h	
980728.4jaj	Physella sp. (physa snail)	c,s,sa,g,Co		2.5h	

## Little River @ SR 2320

### clam

980811.2jaj	Corbicula fluminea (Asian clam)	r,w,C,s,Sa,g		1h	
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### mussel

980811.2jaj	Elliptio spp. (n/a)	r,w,C,s,Sa,g	tactile	1h	169
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# Location

## Site (date) and species

## Substrate

## Technique

## Search

## Time # Live # Shells

### mussel

980811.2jaj Lampsilis cariosa (yellow lampmussel)

980811.2jaj lanceolate Elliptio (lance)

### snail

980811.2jaj Campeloma sp. (n/a)

980811.2jaj Pseudosuccinea sp. (n/a)

## Little River @ SR 2320-

### clam

980811.1jaj Corbicula fluminea (Asian clam)

### mussel

980811.1jaj Elliptio spp. (n/a)

980811.1jaj lanceolate Elliptio (lance)

### snail

980811.1jaj Campeloma sp. (n/a)

980811.1jaj Pseudosuccinea sp. (n/a)

## Little River @ SR 2339+

### clam

980804.1jaj Corbicula fluminea (Asian clam)

980804.2jaj Corbicula fluminea (Asian clam)

### mussel

980804.1jaj Elliptio spp. (n/a)

980804.2jaj Elliptio spp. (n/a)

980804.1jaj lanceolate Elliptio (lance)

### snail

980804.1jaj Campeloma sp. (n/a)

980804.2jaj Campeloma sp. (n/a)

980804.2jaj Helisoma anceps (two-ridge rams-horn)

980804.1jaj Physella sp. (physa snail)

## Little River @ SR 2352+

### clam

980625.2jaj Corbicula fluminea (Asian clam)

980625.3jaj Corbicula fluminea (Asian clam)

### mussel

980625.2jaj Elliptio spp. (n/a)

980625.3jaj Elliptio spp. (n/a)

Location	Site (date) and species	Substrate	Technique	Search Time	# Live # Shells
<u>muschel</u>					
	980625.2jaj lanceolate Elliptio (lance)	r,C,s,Sa	tactile	2.5h	16
	980625.3jaj lanceolate Elliptio (lance)	w,C,S,Sa	tactile	2.5h	24
	980625.3jaj Utterbackia imbecillis (paper pondshell)	w,C,S,Sa	tactile	2.5h	1
<u>snail</u>					
	980625.2jaj Campeloma sp. (n/a)	r,C,s,Sa		2.5h	
	980625.3jaj Campeloma sp. (n/a)	w,C,S,Sa		2.5h	
<u>Long Creek @ NC 96-</u>					
<u>muschel</u>					
	980518.1jaj none (n/a)	s,sa,g	visual	0.5h	
<u>Middle Creek @ NC 210-</u>					
<u>muschel</u>					
	920910.6jma Elliptio spp. (n/a)			0.7h	2
<u>Middle Creek @ NC 50-</u>					
<u>muschel</u>					
	920518.1jma Alasmidonta heterodon (dwarf wedgemussel)			7h	2
	920518.1jma Alasmidonta undulata (triangle floater)			7h	
	920518.1jma Elliptio spp. (n/a)			7h	184
	950411.1jma Elliptio spp. (n/a)			0.78h	42
	920518.1jma Lampsilis radiata (eastern lampmussel)			7h	1
	920518.1jma Pyganodon catartata (eastern floater)			7h	1
	950411.1jma Strophitus undulatus (creeper)			0.78h	1
<u>Middle Creek @ NC 50+</u>					
<u>muschel</u>					
	920518.2jma Elliptio spp. (n/a)			3.5h	162
	920518.2jma Fusconaia masoni (Atlantic pigtoe)			3.5h	1
	920518.2jma Lampsilis radiata (eastern lampmussel)			3.5h	
<u>Middle Creek @ NC 50+-</u>					
<u>muschel</u>					
	930429.1jma Alasmidonta undulata (triangle floater)				1
	930429.1jma Elliptio spp. (n/a)				48
	930429.1jma Lampsilis radiata (eastern lampmussel)				1

Location	Site (date) and species	Substrate	Technique	Time	# Live	# Shells
<u>Middle Creek @ SR 1330</u>						
	<u>clam</u>					
	980820.2tws Corbicula fluminea (Asian clam)	s,sa	SCUBA	1.5h		
	<u>mussel</u>					
	990719.1tws Elliptio lanceolata (yellow lance)		visual/snorkel	10h	1	
	980820.2tws Elliptio spp. (n/a)	s,sa	SCUBA	1.5h	2	
	990719.1tws Elliptio spp. (n/a)		visual/snorkel	10h	50	
	990719.1tws Fusconaia masoni (Atlantic pigtoe)		visual/snorkel	10h	1	
<u>Middle Creek @ SR 1504</u>						
	<u>clam</u>					
	950901.1tws Corbicula fluminea (Asian clam)	n/a	snorkel	1h		
	<u>mussel</u>					
	950901.1tws Elliptio lanceolata (yellow lance)	n/a	snorkel	1h	2	
	950901.1tws Elliptio spp. (n/a)	n/a	snorkel	1h	64	
<u>Middle Creek @ SR 1507+</u>						
	<u>mussel</u>					
	920910.5jma Alasmidonta heterodon (dwarf wedgemussel)			1h	1	
	920910.5jma Elliptio lanceolata (yellow lance)			1h		2
	920910.5jma Elliptio spp. (n/a)			1h	69	
	920910.5jma Lampsilis radiata (eastern lampmussel)			1h	2	
	920910.5jma lanceolata Elliptio (lance)			1h	3	
<u>Middle Creek @ SR 1531-</u>						
	<u>mussel</u>			0.78h		
	950412.4jma n/a (n/a)					
<u>Mill Creek @ SR 1009-</u>						
	<u>mussel</u>					
	910903.2jma Elliptio spp. (n/a)			2h	40	
	910903.2jma lanceolata Elliptio (lance)			2h	52	
<u>Mill Creek @ SR 1009+</u>						
	<u>mussel</u>					
	920915.1jma Elliptio spp. (n/a)			0.5h	36	
	920915.1jma lanceolata Elliptio (lance)			0.5h	41	



Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
Mill Creek @ SR 1200-/+	<u>muschel</u>					
	940603.1jma Alasmidonta undulata (triangle floater)				1	
	940603.1jma Elliptio lanceolata (yellow lance)					2
	940603.1jma Elliptio roanokensis (Roanoke slabshell)					
	940603.1jma Elliptio spp. (n/a)					
	940603.1jma Lampsilis radiata (eastern lampmussel)				1	
	940603.1jma lanceolate Elliptio (lance)				12	
Moccasin Creek @ SR 2531+	<u>muschel</u>					
	910828.1jma Utterbackia imbecillis (paper pondshell)			1.5h		
Moccasin Creek @ NC 231	<u>crayfish</u>					
	911023.1cmg Cambarus (Depressicambarus) latimanus (n/a)				2	
Neuse River @	<u>clam</u>					
	830706.2021ahc Corbicula fluminea (Asian clam)	s,sa	visual	1.8h		
	830710.2020ahc Corbicula fluminea (Asian clam)	s,sa	visual	0.6h	22	
	830713.2028ahc Corbicula fluminea (Asian clam)	s,sa	visual	0.5h		
	<u>muschel</u>					
Neuse River Trib @ US 70-/SR 1003	830706.2021ahc Elliptio complanata (eastern Elliptio)	s,sa	visual	1.8h	1	3
	830710.2020ahc Elliptio complanata (eastern Elliptio)	s,sa	visual	0.6h	1	
	830713.2028Aahc none (n/a)	s,sa	visual	0.1h		
	<u>muschel</u>					
Neuse River @ SR 1908-	910507.2jma none (n/a)					
	<u>muschel</u>					
Reedy Branch @ SR 1501-	910903.3jma Elliptio congraca (Carolina slabshell)			1.5h	1	
	910903.3jma Elliptio roanokensis (Roanoke slabshell)			1.5h	14	
	910903.3jma Elliptio spp. (n/a)			1.5h	24	
	<u>muschel</u>					
	960523.2jma none (n/a)			0.3h		

Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<u>mussel</u>						
Reedy Branch @ SR 1563						
<u>mussel</u>						
940525.3tws	none (n/a)	s,sa,co		1h	0	
Roadside ditch @ SR 1947						
<u>crayfish</u>						
920403.3cmg	Procambarus (Ortmannicus) medialis (Tar River/Albemarle)					
Spring Branch @ SR 1001-						
<u>mussel</u>						
980603.2jaj	none (n/a)	S,sa,g	tactile	0.67h		
Swift Creek @ n/a						
<u>mussel</u>						
910327.2jma	Elliptio eomplanata (eastern Elliptio)			2h		
Swift Creek @ White Oak Creek @ SR 1525+						
<u>mussel</u>						
940915.7jma	Alasmidontia heterodon (dwarf wedgemussel)			0.5h	1	
940915.7jma	Elliptio spp. (n/a)			0.5h	120	
940915.7jma	Strophitus undulatus (creeper)			0.5h	1	
Swift Creek @ I-40-						
<u>mussel</u>						
950412.1jma	Elliptio spp. (n/a)			0.5h	165	
950412.2jma	Elliptio spp. (n/a)			0.5h	166	
950412.1jma	Lampsilis radiata (eastern lampmussel)			0.5h	1	
Swift Creek @ I-40+						
<u>mussel</u>						
960521.1jma	Alasmidontia heterodon (dwarf wedgemussel)				1	
960521.3jma	Alasmidontia heterodon (dwarf wedgemussel)				1	
970729.2jaj	Alasmidontia heterodon (dwarf wedgemussel)	r,c,s,Sa,g	tactile/visual	2h	2	1
970729.3jaj	Alasmidontia heterodon (dwarf wedgemussel)	r,c,s,Sa,g	tactile/visual	2h	2	
971013.1jaj	Alasmidontia heterodon (dwarf wedgemussel)	r,c,s,Sa,g	tactile/visual	2.33h	4	
960521.2jma	Alasmidontia undulata (triangle floater)				1	
970729.1jaj	Alasmidontia undulata (triangle floater)	r,c,s,Sa,g	tactile/visual	2h	3	
970729.2jaj	Alasmidontia undulata (triangle floater)	r,c,s,Sa,g	tactile/visual	2h	5	
971013.1jaj	Elliptio congrua (Carolina slabshell)	r,c,s,Sa,g	tactile/visual	2.33h	1	

Location	Site (date) and species	Substrate	Technique	Time	# Live # Shells
<i>mussel</i>					
	960521.1jma Elliptio lanceolata (yellow lance)				1
	960521.2jma Elliptio lanceolata (yellow lance)				1
	960521.3jma Elliptio lanceolata (yellow lance)				2
	970729.2jaj Elliptio lanceolata (yellow lance)	r,c,s,Sa,g	tactile/visual	2h	2
	971013.1jaj Elliptio roanokensis (Roanoke slabshell)	r,c,s,Sa,g	tactile/visual	2.33h	1
	960521.1jma Elliptio spp. (n/a)				
	960521.2jma Elliptio spp. (n/a)				
	960521.3jma Elliptio spp. (n/a)				
	970729.1jaj Elliptio spp. (n/a)	r,c,s,Sa,g	tactile/visual	2h	328
	970729.2jaj Elliptio spp. (n/a)	r,c,s,Sa,g	tactile/visual	2h	381
	970729.3jaj Elliptio spp. (n/a)	r,c,s,Sa,g	tactile/visual	2h	324
	971013.1jaj Elliptio spp. (n/a)	r,c,s,Sa,g	tactile/visual	2.33h	454
	960521.1jma Fusconaia masoni (Atlantic pigtoe)				1
	970729.1jaj Fusconaia masoni (Atlantic pigtoe)	r,c,s,Sa,g	tactile/visual	2h	2
	970729.2jaj Fusconaia masoni (Atlantic pigtoe)	r,c,s,Sa,g	tactile/visual	2h	2
	971013.1jaj Fusconaia masoni (Atlantic pigtoe)	r,c,s,Sa,g	tactile/visual	2.33h	2
	970729.1jaj Lampsilis radiata (eastern lampmussel)	r,c,s,Sa,g	tactile/visual	2h	1
	970729.2jaj Lampsilis radiata (eastern lampmussel)	r,c,s,Sa,g	tactile/visual	2h	1
	970729.3jaj Lampsilis radiata (eastern lampmussel)	r,c,s,Sa,g	tactile/visual	2h	1
	960521.2jma Strophitus undulatus (creeper)				1
	970729.1jaj Strophitus undulatus (creeper)	r,c,s,Sa,g	tactile/visual	2h	1
	970729.3jaj Strophitus undulatus (creeper)	r,c,s,Sa,g	tactile/visual	2h	2
	971013.1jaj Strophitus undulatus (creeper)	r,c,s,Sa,g	tactile/visual	2.33h	3
	970729.2jaj Uterbackia imbecillis (paper pondshell)	r,c,s,Sa,g	tactile/visual	2h	1
<i>snail</i>					
	971013.1jaj Campeloma sp. (n/a)	r,c,s,Sa,g	tactile/visual	2.33h	
	971013.1jaj Physella sp. (physa snail)	r,c,s,Sa,g	tactile/visual	2.33h	
<u>Swift Creek @ NC 210</u>					
<i>mussel</i>					
	910327.3jma Elliptio complanata (eastern Elliptio)			1h	
<u>Swift Creek @ NC 210-</u>					
<i>mussel</i>					
	920911.1jma Elliptio lanceolata (yellow lance)			1h	1
	920911.1jma Elliptio roanokensis (Roanoke slabshell)			1h	2
	920911.1jma Elliptio spp. (n/a)			1h	118



Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<i>muscle</i>						
	950410.1jma Elliptio spp. (n/a)			0.75h	10	
	920911.1jma Lampsilis radiata (eastern lampmussel)			1h	4	
<u>Swift Creek @ NC 210+</u>						
<i>muscle</i>						
	950410.2jma Elliptio spp. (n/a)			0.82h	36	
<u>Swift Creek @ NC 42/SR 1525</u>						
<i>muscle</i>						
	940901.0jma Alasmidonta heterodon (dwarf wedgemussel)			0.2h	1	
	940901.4jma Alasmidonta heterodon (dwarf wedgemussel)			0.3h	1	
	940901.3jma Alasmidonta undulata (triangle floater)			0.2h	1	
	940901.3jma Elliptio lanceolata (yellow lance)			0.2h	1	
	940901.0jma Elliptio spp. (n/a)			0.2h	12	
	940901.1jma Elliptio spp. (n/a)			0.2h	19	
	940901.2jma Elliptio spp. (n/a)			0.2h	100	
	940901.3jma Elliptio spp. (n/a)			0.2h	49	
	940901.4jma Elliptio spp. (n/a)			0.3h	75	
	940901.1jma Fusconaia masoni (Atlantic pigtoe)			0.2h	1	
	940901.2jma Fusconaia masoni (Atlantic pigtoe)			0.2h	1	
	940901.3jma Fusconaia masoni (Atlantic pigtoe)			0.2h	1	
	940901.5jma Lampsilis radiata (eastern lampmussel)				1	
	940901.2jma Pyganodon cataracta (eastern floater)			0.2h	1	
<u>Swift Creek @ SR 1501-</u>						
<i>muscle</i>						
	910327.1jma Alasmidonta heterodon (dwarf wedgemussel)			3h	1	
	910327.1jma Elliptio complanata (eastern Elliptio)			3h	101	
	910327.1jma Elliptio icterina (variable spike)			3h	19	
	910327.1jma Elliptio lanceolata (yellow lance)			3h	1	
	960523.1jma Elliptio lanceolata (yellow lance)			2.3h	1	
	920911.2jma Elliptio roanokensis (Roanoke slabshell)			1h	2	
	950410.3jma Elliptio roanokensis (Roanoke slabshell)			0.77h	2	
	920911.2jma Elliptio spp. (n/a)			1h	143	
	950410.3jma Elliptio spp. (n/a)			0.77h	19	
	960523.1jma Elliptio spp. (n/a)			2.3h	29	
	920911.2jma Fusconaia masoni (Atlantic pigtoe)			1h	1	
	920911.2jma Lampsilis radiata (eastern lampmussel)			1h	2	

Location	Site (date) and species	Substrate	Technique	Time	# Live	# Shells
Swift Creek @ SR 1525-						
	<i>clam</i>					
	970728.1jaj Corbicula fluminea (Asian clam)	r,C,s,Sa	tactile/visual	2h		
	970728.2jaj Corbicula fluminea (Asian clam)	r,c,s,Sa,g	tactile/visual	2h		
	970728.3jaj Corbicula fluminea (Asian clam)	r,c,s,Sa,g	tactile/visual	2h		
	970728.4jaj Corbicula fluminea (Asian clam)	r,c,s,Sa,g	tactile/visual	2h		
	<i>mussel</i>					
	970728.4jaj Alasmidonta heterodon (dwarf wedgemussel)	r,c,s,Sa,g	tactile/visual	2h	3	
	970728.4jaj Alasmidonta undulata (triangle floater)	r,c,s,Sa,g	tactile/visual	2h	3	
	920911.4jma Elliptio lanceolata (yellow lance)			1h		2
	970728.1jaj Elliptio lanceolata (yellow lance)	r,C,s,Sa	tactile/visual	2h	1	
	970728.3jaj Elliptio lanceolata (yellow lance)	r,c,s,Sa,g	tactile/visual	2h	1	
	920911.4jma Elliptio spp. (n/a)			1h	195	
	970728.1jaj Elliptio spp. (n/a)	r,C,s,Sa	tactile/visual	2h	273	
	970728.2jaj Elliptio spp. (n/a)	r,c,s,Sa,g	tactile/visual	2h	390	
	970728.3jaj Elliptio spp. (n/a)	r,c,s,Sa,g	tactile/visual	2h	567	
	970728.4jaj Elliptio spp. (n/a)	r,c,s,Sa,g	tactile/visual	2h	499	
	920911.4jma Fusconaia masoni (Atlantic pigtoe)			1h		1
	970728.2jaj Fusconaia masoni (Atlantic pigtoe)	r,c,s,Sa,g	tactile/visual	2h	1	
	970728.3jaj Fusconaia masoni (Atlantic pigtoe)	r,c,s,Sa,g	tactile/visual	2h	2	
	970728.4jaj Fusconaia masoni (Atlantic pigtoe)	r,c,s,Sa,g	tactile/visual	2h	1	
	920911.4jma Lampsilis radiata (eastern lampmussel)			1h	1	
	970728.2jaj Lampsilis radiata (eastern lampmussel)	r,c,s,Sa,g	tactile/visual	2h	2	
	970728.3jaj Lampsilis radiata (eastern lampmussel)	r,c,s,Sa,g	tactile/visual	2h	1	
	920911.4jma Strophitus undulatus (creeper)			1h	2	
	970728.2jaj Strophitus undulatus (creeper)	r,c,s,Sa,g	tactile/visual	2h	2	
	970728.3jaj Strophitus undulatus (creeper)	r,c,s,Sa,g	tactile/visual	2h	3	
	<i>snail</i>					
	970728.3jaj Campeloma sp. (n/a)	r,c,s,Sa,g	tactile/visual	2h		
Swift Creek @ SR 1525+						
	<i>mussel</i>					
	940915.1jma Alasmidonta undulata (triangle floater)			1h	1	
	940915.1jma Elliptio lanceolata (yellow lance)			1h	1	
	940915.3jma Elliptio lanceolata (yellow lance)			0.2h	1	
	940915.5jma Elliptio lanceolata (yellow lance)			0.2h	1	
	940915.1jma Elliptio spp. (n/a)			1h		255

Location		Substrate		Technique		Search	
Site (date) and species						Time	# Live # Shells
<i>mussel</i>							
940915.2jma Elliptio spp. (n/a)						0.8h	190
940915.3jma Elliptio spp. (n/a)						0.2h	20
940915.5jma Elliptio spp. (n/a)						0.2h	3
940915.6jma Elliptio spp. (n/a)							62
940915.3jma Fusconaia masoni (Atlantic pigtoe)						0.2h	1
940915.4jma Fusconaia masoni (Atlantic pigtoe)						0.2h	4
940915.1jma Lampsilis radiata (eastern lampmussel)						1h	1
940915.2jma Strophitus undulatus (creeper)						0.8h	1
940915.5jma Strophitus undulatus (creeper)						0.2h	1
940915.6jma Strophitus undulatus (creeper)							1
<u>Swift Creek @ SR 1555</u>							
<i>crayfish</i>							
920421.1cmg Orconectes (Procericambanus) carolinensis (NC spiny crayfish)							1
<i>mussel</i>							
970730.1jaj Alasmidonta undulata (triangle floater)		r,c,s,Sa,g		tactile/visual		1.33h	2
970730.2jaj Alasmidonta undulata (triangle floater)		r,c,s,Sa,g		tactile/visual		2h	2
970730.1jaj Elliptio spp. (n/a)		r,c,s,Sa,g		tactile/visual		1.33h	54
970730.2jaj Elliptio spp. (n/a)		r,c,s,Sa,g		tactile/visual		2h	185
970730.3jaj Elliptio spp. (n/a)		r,c,s,Sa,g		tactile/visual		1.6h	175
970730.2jaj Fusconaia masoni (Atlantic pigtoe)		r,c,s,Sa,g		tactile/visual		2h	1
970730.3jaj Fusconaia masoni (Atlantic pigtoe)		r,c,s,Sa,g		tactile/visual		1.6h	1
970730.2jaj Lampsilis radiata (eastern lampmussel)		r,c,s,Sa,g		tactile/visual		2h	1
970730.3jaj Strophitus undulatus (creeper)		r,c,s,Sa,g		tactile/visual		1.6h	1
<u>Swift Creek @ SR 1555-</u>							
<i>mussel</i>							
910411.1jma Alasmidonta heterodon (dwarf wedgemussel)						1h	1
920319.2jma Alasmidonta heterodon (dwarf wedgemussel)						2h	2
910327.4jma Alasmidonta undulata (triangle floater)						0.5h	
910411.1jma Alasmidonta undulata (triangle floater)						1h	2
970623.1jaj Alasmidonta undulata (triangle floater)				tactile/visual		0.5h	4
910327.4jma Elliptio complanata (eastern Elliptio)						0.5h	
910411.1jma Elliptio complanata (eastern Elliptio)		s,Sa,g,c,bo				1h	129
910327.4jma Elliptio icterina (variable spike)						0.5h	
910411.1jma Elliptio icterina (variable spike)						1h	27
910327.4jma Elliptio roanokensis (Roanoke slabshell)						0.5h	



# Location

Location	Site (date) and species	Substrate	Technique	Time	# Live	# Shells
<u>mussel</u>						
	910411.1jma Elliptio roanokensis (Roanoke slabshell)			1h	13	
	950411.2jma Elliptio roanokensis (Roanoke slabshell)			0.33h	2	
	950411.4jma Elliptio roanokensis (Roanoke slabshell)			0.33h	2	
	950411.5jma Elliptio roanokensis (Roanoke slabshell)			0.33h	4	
	950411.6jma Elliptio roanokensis (Roanoke slabshell)			0.33h	8	
	960523.4jma Elliptio roanokensis (Roanoke slabshell)			3h	1	
	970623.1jaj Elliptio roanokensis (Roanoke slabshell)	s,Sa,g,c,bo	tactile/visual	0.5h	3	
	950411.2jma Elliptio spp. (n/a)			0.33h	132	
	950411.4jma Elliptio spp. (n/a)			0.33h	89	
	950411.5jma Elliptio spp. (n/a)			0.33h	51	
	950411.6jma Elliptio spp. (n/a)			0.33h	122	
	950411.7jma Elliptio spp. (n/a)			0.33h	11	
	960523.4jma Elliptio spp. (n/a)			3h	822	
	970623.1jaj Elliptio spp. (n/a)			0.5h	186	
	910327.4jma Fusconaia masoni (Atlantic pigtoe)	s,Sa,g,c,bo	tactile/visual	0.5h		
	910411.1jma Fusconaia masoni (Atlantic pigtoe)			1h	1	
	960523.4jma Fusconaia masoni (Atlantic pigtoe)			3h	3	
	970623.1jaj Fusconaia masoni (Atlantic pigtoe)	s,Sa,g,c,bo	tactile/visual	0.5h	4	
	910327.4jma Lampsilis radiata (eastern lampmussel)			0.5h		
	910411.1jma Lampsilis radiata (eastern lampmussel)			1h	1	
	950411.2jma Lampsilis radiata (eastern lampmussel)			0.33h	1	
	950411.5jma Lampsilis radiata (eastern lampmussel)			0.33h	1	
	970623.1jaj Lampsilis radiata (eastern lampmussel)	s,Sa,g,c,bo	tactile/visual	0.5h		
	910411.1jma Lasnigona subviridis (green floater)			1h	1	
	910327.4jma Strophitus undulatus (creeper)			0.5h		
	910411.1jma Strophitus undulatus (creeper)			1h	1	
	950411.2jma Strophitus undulatus (creeper)			0.33h	1	
	970623.1jaj Strophitus undulatus (creeper)	s,Sa,g,c,bo	tactile/visual	0.5h	1	
	910411.1jma Villosa constricta (notched rainbow)			1h		2
	960523.4jma Villosa constricta (notched rainbow)			3h	1	
Swift Creek @ SR 1555+						
<u>mussel</u>						
	960522.1jma Alasmidonta undulata (triangle floater)				2	
	960522.2jma Alasmidonta undulata (triangle floater)				2	
	960522.1jma Elliptio congareae (Carolina slabshell)				1	
	960522.4jma Elliptio congareae (Carolina slabshell)				3	
	911113.1jma Elliptio roanokensis (Roanoke slabshell)			1h		

Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<u>musel</u>						
	950411.3jma Elliptio roanokensis (Roanoke slabshell)			0.42h	3	
	960522.4jma Elliptio roanokensis (Roanoke slabshell)				2	
	911113.1jma Elliptio spp. (n/a)			1h		
	950411.3jma Elliptio spp. (n/a)			0.42h	36	
	960522.1jma Elliptio spp. (n/a)				109	
	960522.2jma Elliptio spp. (n/a)					
	960522.4jma Elliptio spp. (n/a)					
	960522.1jma Fusconaia masoni (Atlantic pigtoe)				2	
	960522.4jma Fusconaia masoni (Atlantic pigtoe)				1	
	960522.4jma Lampsilis radiata (eastern lampmussel)				1	
	960522.3jma lanceolate Elliptio (lance)				2	
	960522.4jma lanceolate Elliptio (lance)				4	
<u>Swift Creek @ SR 1562</u>						
<u>clam</u>						
	940525.5tws Corbicula fluminea (Asian clam)	sa,g,co		0.5h		
<u>musel</u>						
	940525.5tws Elliptio lanceolata (yellow lance)	sa,g,co		0.5h	18	
	940525.5tws Elliptio spp. (n/a)	sa,g,co		0.5h	14	
<u>Swift Creek @ SR 1562-</u>						
<u>musel</u>						
	920911.3jma Alasmidonta undulata (triangle floater)			1h	1	
	960522.5jma Alasmidonta undulata (triangle floater)				2	
	960522.5jma Elliptio congraea (Carolina slabshell)					
	920911.3jma Elliptio lanceolata (yellow lance)			1h		3
	960522.5jma Elliptio roanokensis (Roanoke slabshell)				1	
	920911.3jma Elliptio spp. (n/a)			1h	131	
	960522.5jma Elliptio spp. (n/a)					
	920911.3jma Lampsilis radiata (eastern lampmussel)			1h	4	
	920911.3jma Strophitus undulatus (creeper)			1h	1	
	920911.3jma Villosa constricta (notched rainbow)			1h		1
	960522.5jma Villosa constricta (notched rainbow)					1
<u>Swift Creek @ SR 1562+</u>						
<u>musel</u>						
	950410.4jma Alasmidonta undulata (triangle floater)			0.67h	2	
	950410.4jma Elliptio spp. (n/a)			0.67h	26	

Location	Site (date) and species	Substrate	Technique	Search Time	# Live	# Shells
<i>mussel</i>						
	950410.4jma Strophitus undulatus (creeper)			0.67h	1	
	<u>White Oak Creek @ NC 42</u>					
<i>clam</i>						
	991027.1tws Corbicula fluminea (Asian clam)					
<i>mussel</i>						
	991027.1tws Elliptio spp. (n/a)				3	5
	991027.1tws Uterbackia imbecillis (paper pondshell)					10
	<u>White Oak Creek @ NC 42+</u>					
<i>mussel</i>						
	920420.1jma Alasmidonta heterodon (dwarf wedgemussel)			1h	1	
	920420.1jma Elliptio complanata (eastern Elliptio)			1h	98	
	920420.1jma Elliptio icterina (variable spike)			1h	27	
	920420.1jma Pyganodon cataracta (eastern floater)			1h		
	920420.1jma Uterbackia imbecillis (paper pondshell)			1h		
	<u>Johnston/Wayne County line</u>					
	<u>Mill Creek @ SR 1212</u>					
<i>mussel</i>						
	940603.1tws Alasmidonta undulata (triangle floater)	n/a	visual	1h	2	
	940525.1tws Elliptio lanceolata (yellow lance)	n/a	snorkel	1h	6	
	940525.1tws Elliptio roanokensis (Roanoke slabshell)	n/a	snorkel	1h	25	
	940525.1tws Elliptio spp. (n/a)	n/a	snorkel	1h		
	940603.1tws Lampsilis radiata (eastern lampmussel)	n/a	visual	1h	5	
	940525.1tws lanceolate Elliptio (lance)	n/a	snorkel	1h		



**Table 4.** Freshwater fish species collected during the Johnston County aquatic inventory.

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Amblyopsidae	
<i>Chologaster cornuta</i>	swampfish
Amiidae	
<i>Amia calva</i>	bowfin
Anguillidae	
<i>Anguilla rostrata</i>	american eel
Aphredoderidae	
<i>Aphredoderus sayanus</i>	pirate perch
Catostomidae	
<i>Erimyzon oblongus</i>	creek chubsucker
<i>Hypentelium nigricans</i>	northern hogsucker
<i>Moxostoma collapsum</i>	v-lip redhorse
<i>Scartomyzon cervinus</i>	black jumprock
Centrarchidae	
<i>Centrarchus macropterus</i>	flier
<i>Chaenobryttus gulosus</i>	warmouth
<i>Enneacanthus gloriosus</i>	bluespotted sunfish
<i>Lepomis auritus</i>	redbreast sunfish
<i>Lepomis cyanellus</i>	green sunfish
<i>Lepomis gibbosus</i>	pumpkinseed sunfish
<i>Lepomis macrochirus</i>	bluegill sunfish
<i>Micropterus salmoides</i>	largemouth bass
Clupeidae	
<i>Alosa sapidissima</i>	American shad
Cyprinidae	
<i>Cyprinella analostana</i>	satinfin shiner
<i>Hybognathus regius</i>	eastern silvery minnow
<i>Luxilus albeolus</i>	white shiner
<i>Lythrurus matutinus</i>	pinewoods shiner
<i>Nocomis leptcephalus</i>	bluehead chub
<i>Notemigonus crysoleucas</i>	golden shiner
<i>Notropis cummingsae</i>	darky shiner
<i>Notropis procne</i>	swallowtail shiner
Elassomatidae	
<i>Elassoma zonatum</i>	banded pygmy sunfish
Esocidae	
<i>Esox americanus</i>	redfin pickerel

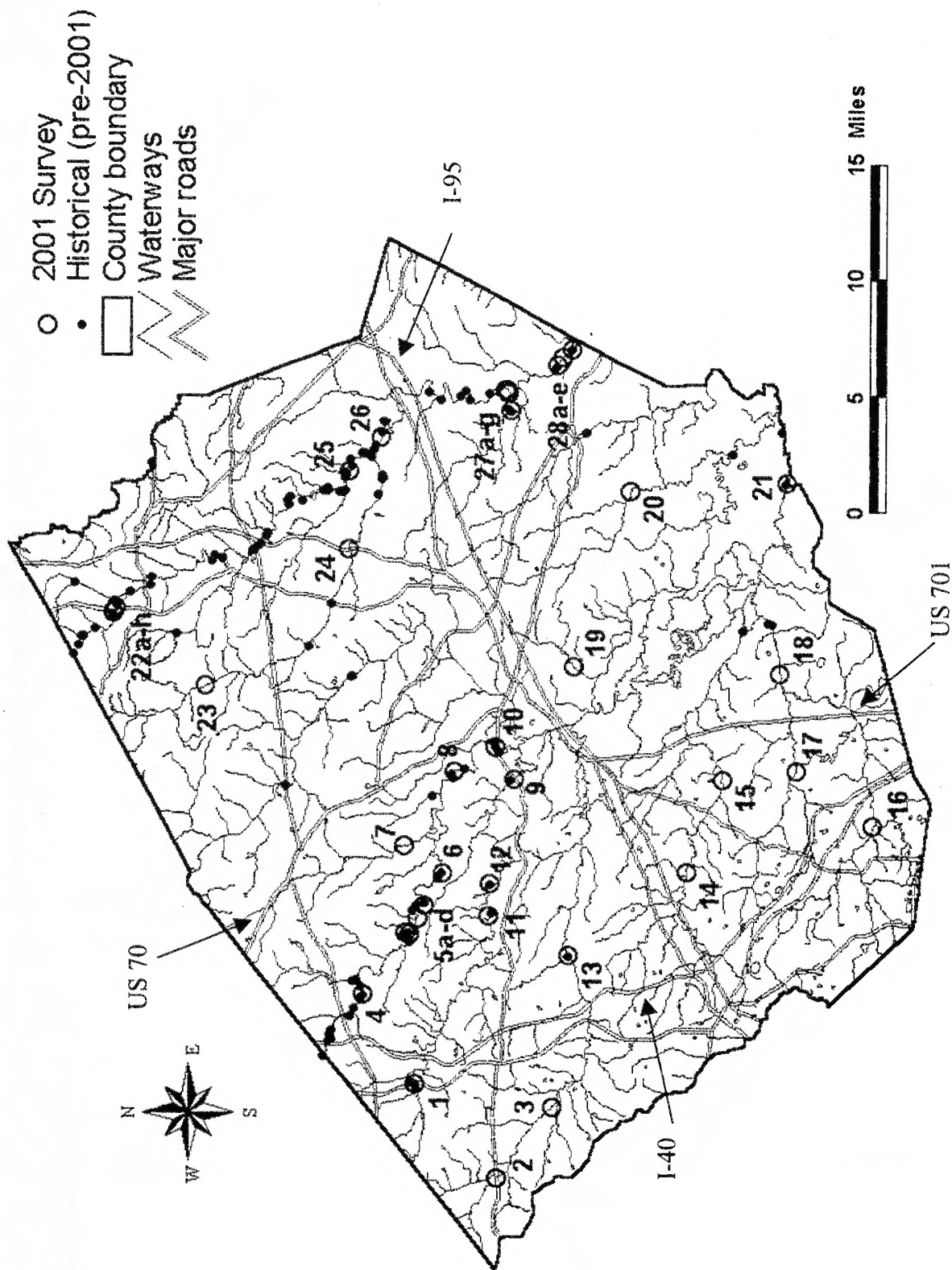
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**Table 4 (cont.).** Freshwater fish species collected during the Johnston County aquatic inventory.

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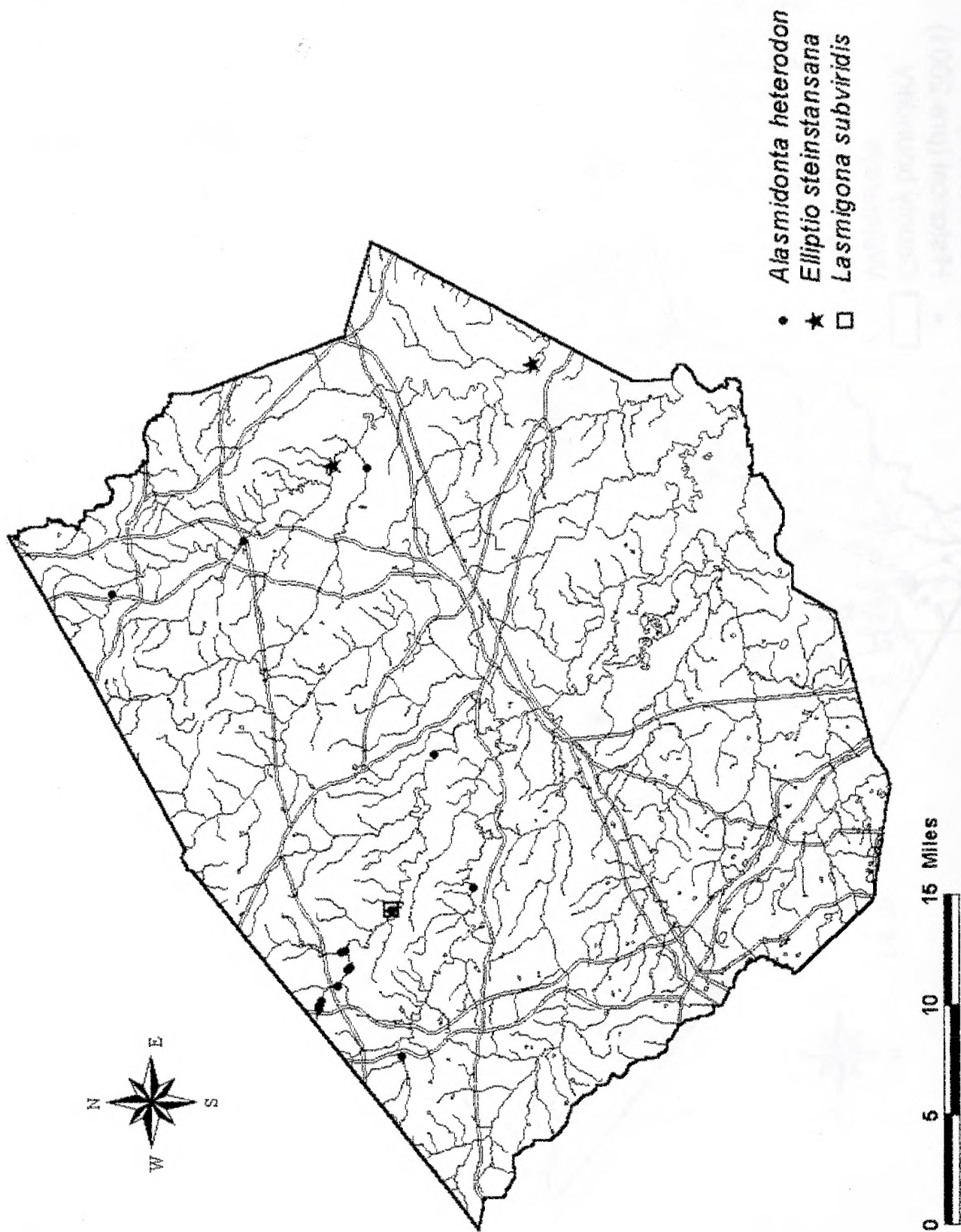
Ictaluridae		
<i>Ameiurus catus</i>		white catfish
<i>Ameiurus natalis</i>		yellow bullhead
<i>Ameiurus platycephalus</i>		flat bullhead
<i>Ictalurus punctatus</i>		channel catfish
<i>Noturus gyrinus</i>		tadpole madtom
<i>Noturus insignis</i>		marginated madtom
<i>Pylodictus olivaris</i>		flathead catfish
Lepisosteidae		
<i>Lepisosteus osseus</i>		longnose gar
Percidae		
<i>Etheostoma flabellare</i>		fantail darter
<i>Etheostoma fusiforme</i>		swamp darter
<i>Etheostoma nigrum/olmstedii</i>		johnny/tessellated darter
<i>Etheostoma serrifer</i>		sawcheek darter
<i>Etheostoma vitreum</i>		glassy darter
<i>Percina peltata</i>		shield darter
<i>Percina roanoka</i>		Roanoke darter
Poeciliidae		
<i>Gambusia holbrooki</i>		eastern mosquitofish
Umbridae		
<i>Umbra pygmaea</i>		eastern mudminnow

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**Figure 1.** Sites surveyed during the aquatic inventory of Johnston County, 2001 (numbered open circles; see Table 1 for detailed information). Also shown here are historical sites (black dots) that were surveyed previous to 2001.





**Figure 2a.** State endangered aquatic species occurrences documented in the aquatic inventory of Johnston County (all years).

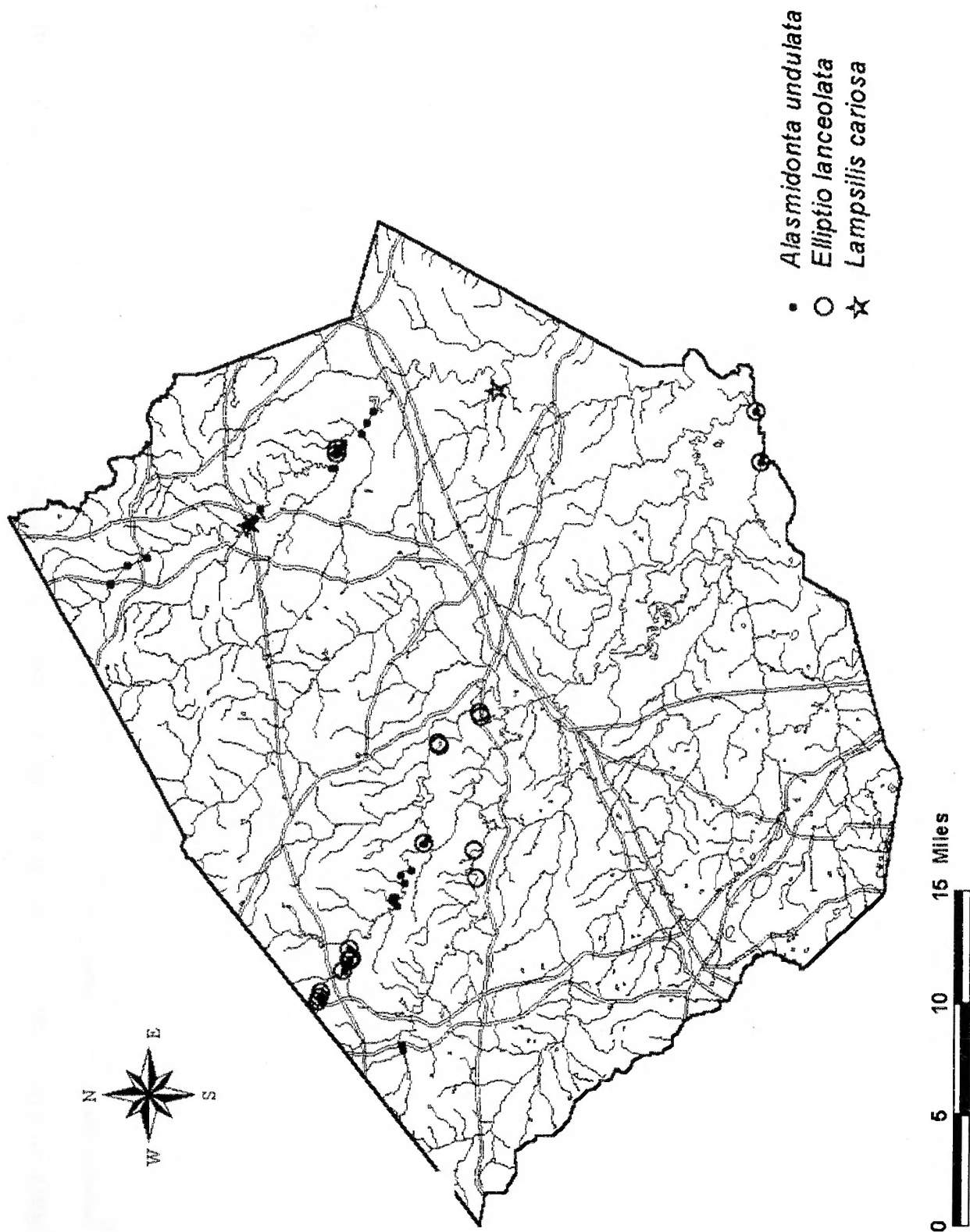


Figure 2b. State threatened aquatic species (part I) occurrences documented in the aquatic inventory of Johnston County (all years).



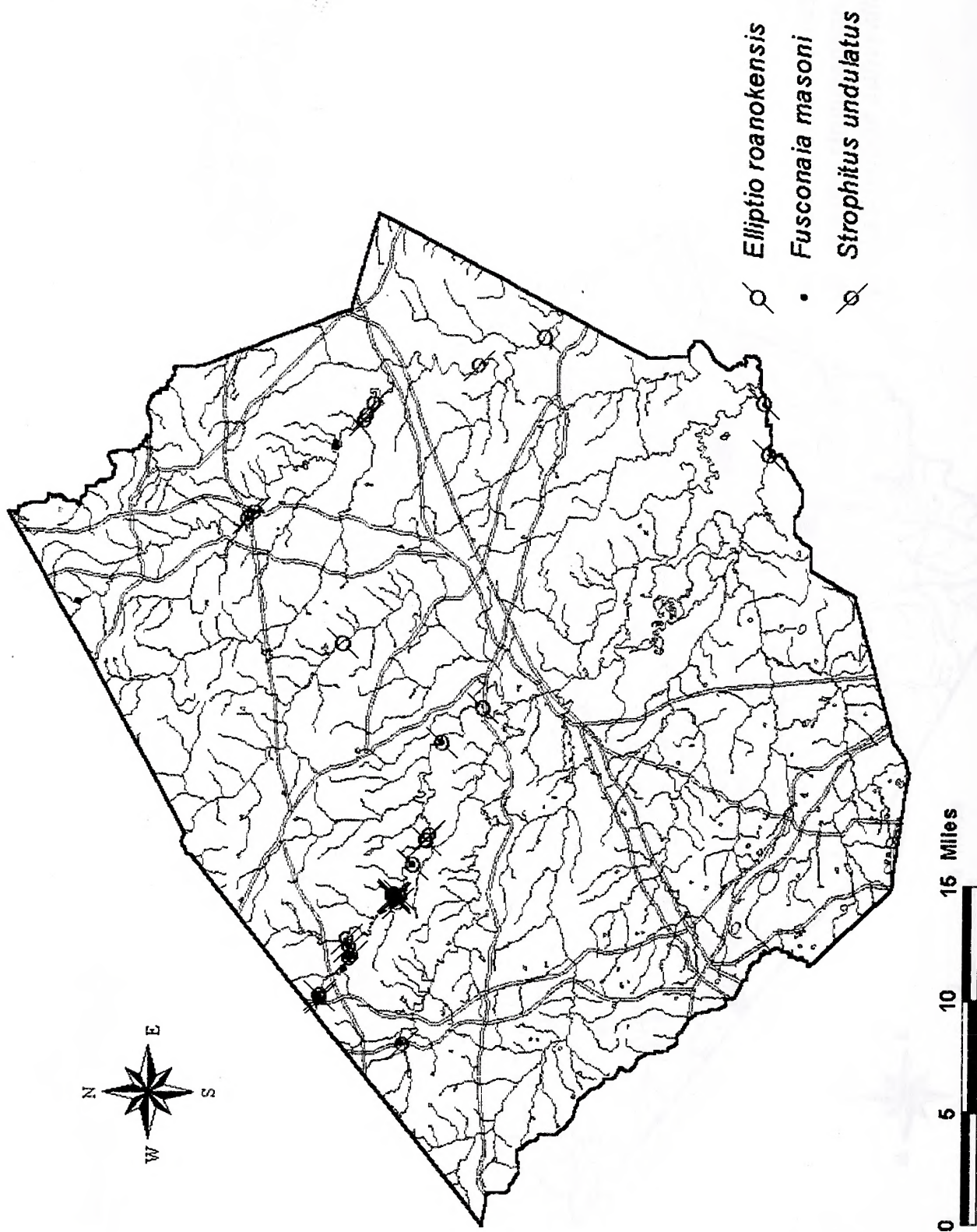
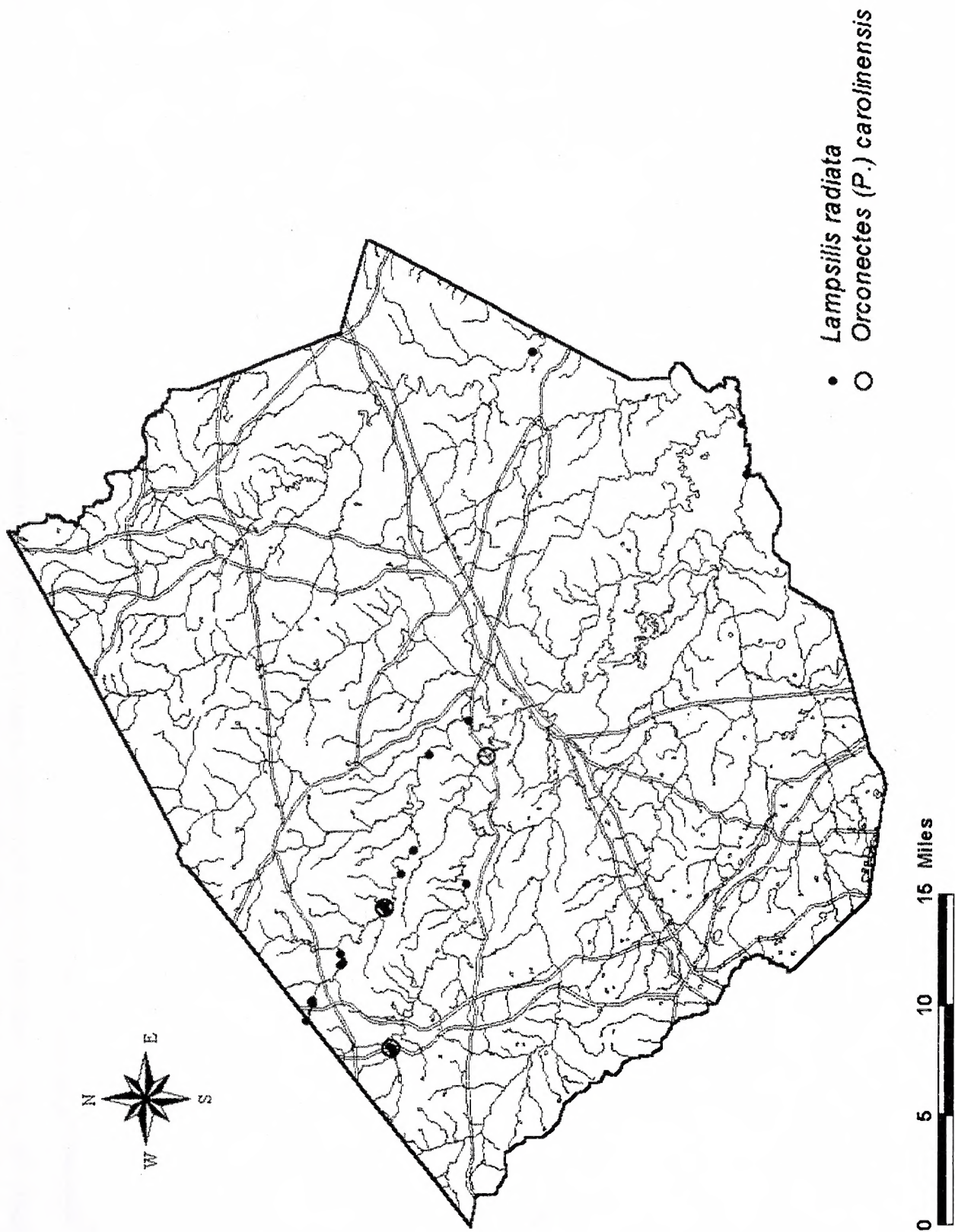
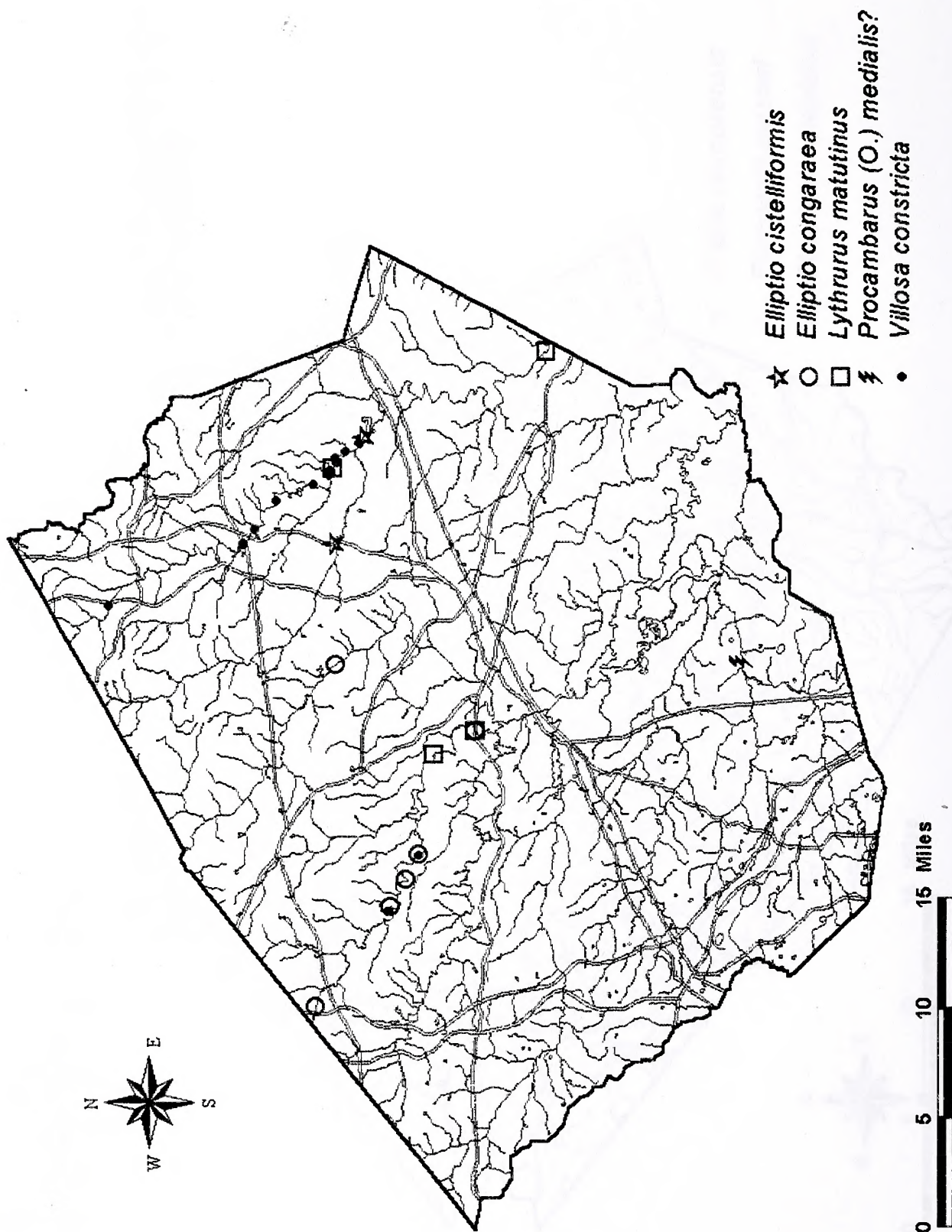


Figure 2c. State threatened aquatic species (part II) occurrences documented in the aquatic inventory of Johnston County (all years).





**Figure 2d.** State special concern aquatic species occurrences documented in the aquatic inventory of Johnston County (all years).



**Figure 2e.** Significantly rare (watch list) aquatic species occurrences documented in the aquatic inventory of Johnston County (all years).



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